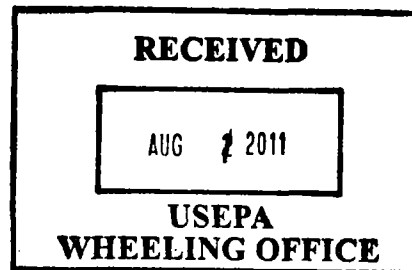

Southpointe Energy Complex • 370 Southpointe Boulevard, Suite 100 • Canonsburg, Pennsylvania 15317
kkomoroski@fulbright.com • Direct: 724 416 0420 • Main: 724 416 0400 • Facsimile: 724 416 0404

July 29, 2011

VIA E-MAIL AND FEDERAL EXPRESS

Karen Melvin
Associate Division Director
Office of Enforcement
Hazardous Site Cleanup Division
U.S. Environmental Protection Agency, Region III
Oil and Prevention Branch (3HS61)
1060 Chapline Street
Wheeling, WV 26003



Re: McAdams Property

Dear Ms. Melvin:

Enclosed please find the response to your information request regarding the subject property.
Thank you for the courtesies you extended in submittal of this response.

Sincerely,

Kenneth S. Komoroski/MSU

Kenneth Komoroski

KSK

Enclosures: Responses

cc: James Van Orden, Esq.
Paula Curtin

**Range Resources-Appalachia, LLC's Responses to the United States Environmental
Protection Agency's Request for Information**

The request for information (the "Request") of the U.S. Environmental Protection Agency ("EPA") seeks to obtain information regarding a discharge of groundwater which occurred on March 10, 2011 at or near 1085 McAdams Road, Washington Co., Pennsylvania, which is the address of property owned by Mr. and Mrs. John Voyles. On that date a small release of groundwater occurred on or near the Range Resources-Appalachia, LLC ("Range") Yeager Unit Well Nos. 1H, 2H and 7H well pad ("Yeager Pad"), which is located in the general vicinity of 1085 McAdams Road. Approximately 20 gallons of groundwater escaped from a valve on a truck that had removed water from the pad. Range believes this is the event to which EPA is referring to in its Request. Range is providing its response accordingly.

The Request was issued under the auspices of obtaining information regarding a possible violation of Section 311(b)(3) of the Federal Water Pollution Control Act, 33 U.S.C. § 1321(b)(3). Section 311(b)(3) prohibits discharges of hazardous substances in excess of quantities as provided by 40 C.F.R. § 117.3. No such release occurred and the EPA's Request is without legal basis under the identified statutory or regulatory authority. Notwithstanding the lack of legal authority for the Request, Range voluntarily provides the following responses ("Responses"). To the extent the Request seeks information not specifically pertaining to the release of water at the Yeager Pad, such information requests are both beyond the EPA's investigatory authority as provided by 33 U.S.C. § 1321(b)(3) and 40 C.F.R. § 117.3 and unreasonable under the circumstances.

The Request seeks information pertaining to a "Facility", a term defined in the EPA's Enclosure 1. Range notes that the Enclosure 1 does not define the word "Facility" as a standalone term; Enclosure 1 defines specific types of facilities, such as an "Onshore Facility". Consequently, the use of the term Facility as a standalone term is ambiguous. Range has interpreted information requests incorporating the term "Facility" as seeking information related to structures and equipment on the Yeager Pad and has voluntarily responded accordingly thereto.

RESPONSES

1. Identify all substances released from the Facility in connection with the above referenced Regional Response Center Spill Number or Numbers. Specifically, identify:
 - a. The name and Chemical Abstract Services ("CAS") Number for each substance discharged;
 - b. For oils, identify the type and grade;
 - c. Provide the quantity, concentration of each substance discharged and the method by which the concentration was measured or estimated. For mixtures, provide the name, quantity, and concentration of each constituent of that mixture;
 - d. Provide the solubility and specific gravity of each substance discharged.

Response: The substance released was groundwater. The groundwater was collected and filtered by Highland Environmental ("Highland") before being transferred to the truck from which approximately 20 gallons were accidentally released. Testing using a field meter indicated the water had 9,200 ppm TDS and 8,200 uS conductivity. No reportable hazardous substances were discharged. The groundwater that was discharged was also diluted by heavy rain/stormwater runoff. Absorbent pads/booms were applied where the water was released. Field testing of pooled water near the discharge point indicated TDS and conductivity parameters were not elevated following the accidental release.

2. Describe the physical source (including, but not limited to vehicle, outfall, tank, container, pipe, ditch, conduit, or equipment) at the Facility from which the oil and/or hazardous substance or substances (the term "substance" as used here includes both oils and hazardous substances) initially was discharged on or around March 10, 2011. If the substance was discharged from more than one source, please identify each specific source.

Response: The groundwater discharged did not contain oil or hazardous substances. The filtered groundwater was discharged from a Highland truck which was removing those fluids from the Yeager Pad. Approximately 20 gallons of the filtered groundwater was released from a pressure relief valve on the side of the Highland truck

when water surged forward during the downhill drive and unseated a ball valve. Additionally, the driver had apparently not entirely closed a manual valve.

3. Provide the total quantity of undiluted substance(s) released from the Facility in gallons for oils and in pounds for hazardous substances.

Response: The groundwater released did not contain oil or hazardous substances. Approximately 20 gallons of groundwater were released. The water was diluted by heavy rain/stormwater runoff. Absorbent pads/booms were used as a precaution. Areas of pooled water were tested and did not reveal elevated TDS or conductivity levels. As such, no additional clean up was necessary.

4. List the location of the discharge, including the closest street address, the city, county, state, zip code, and provide the Global Positioning System ("GPS") coordinates.

Response: The water was released was in the general vicinity of Yeager Well No. 1H, which is located at 40° 05' 28.78" N, 80° 13' 40.23" near McAdams Road, Washington County, Pennsylvania.

5. List the starting time, date, and duration of the discharge and the time and date when the discharge entered a waterway.

Response: The Yeager Pad water release occurred on March 10, 2010 at approximately 11:30 a.m. and lasted only a few minutes as the tanker truck drove across the Yeager Pad. The water did not enter a waterway.

6. List the time and date of the discovery of the discharge and the person(s) who made the discovery.

Response: The water release occurred on March 10, 2010 at approximately 11:30 a.m. and was discovered by personnel on the pad as it occurred.

7. List the federal and state agencies, if any, to which the owner and/or operator reported the discharge(s), the dates and times on which the reports were made, and the name(s) and title(s) of the person(s) who made the reports.

Response: Within two hours of the release of the water, in accordance with its Preparedness, Prevention and Contingency (“PPC”) Plan, Range notified the Pennsylvania Department of Environmental Protection (“DEP”). By letter dated March 29, 2011, Range provided a report (“ Report”) to Vince Yantko, Water Quality Specialist Supervisor with DEP. Subsequently, Range also provided to DEP the results of soil and water testing (“Results”) completed by Weavertown Environmental Group (“WEG”), confirming no environmental impacts as a result of the water release. The Report and WEG Results are attached hereto at Tabs 1 and 2.

8. Identify the first body of water that the substance reached. Identify the actual or estimated quantity of the substance(s) that entered that water body. Describe the location of any other water bodies that the substance(s) subsequently entered, including the actual or approximate distance from the Facility. In addition, state the actual or estimated quantity of the substance(s) that entered those additional water bodies.

Response: The water did not reach a body of water.

9. Identify any storm drains or sewers through which the substances flowed, and identify the waters to which those storm drains or sewers subsequently drain. State the actual or estimated quantity of the substance(s) that entered the storm drain or sewer.

Response: The water did not enter a storm drain or sewer.

10. Identify whether each water identified in response to Questions 8 and 9 was, at the time of the spill, a “navigable water” as defined in Enclosure 1, a tributary of a navigable water; and/or physically connected to a navigable water. Identify all such navigable waters by name and identify the type of body of water (e.g. river, stream, lake, creek, or other type of body of water).

Response: The water did not enter a body of water, storm drain or sewer.

11. If no navigable waters are identified in response to Questions 8-10, identify whether the water system at any time connects with or flows into any hydrological system (such as a creek system). If so, identify the flow, extent, and duration of the connection to that system.

Response: **The water did not enter a body of water, storm drain or sewer.**

12. State the flow in cubic feet per second of each water body described in response to Questions 8 and 9. If there is no gauge station in the vicinity, please estimate the flow and provide the basis for that estimate.

Response: **The water did not enter a body of water, storm drain or sewer.**

13. Provide a description and the location of any adjoining shoreline upon which that substance may have reached. In addition, state the quantity of the substance that reached the adjoining shoreline.

Response: **The water did not reach a shoreline.**

14. For all discharges of oil to navigable waters, adjoining shorelines to navigable waters, or to any other water/shoreline, please indicate the following
- a. Did you observe from the oil a film, sheen, discoloration or iridescent appearance on the surface or shoreline of any water? If yes, please describe your observations;
 - b. Did, to your knowledge, any other person observe from the oil a film, sheen, discoloration or iridescent appearance on the surface or shoreline of any water? If yes, please identify all such persons and describe those observations;
 - c. Did you observe any oil sludge or oil emulsion beneath the surface or on the adjoining shorelines of any water? If yes, please describe your observations;
 - d. Did, to your knowledge, any other person observe any oil sludge or oil emulsion to be deposited beneath the surface or on the adjoining shorelines of any water? If yes, please identify all such persons and describe those observations.

Response: **The water released was not a release of oil and did not reach any body of water or shoreline. No oil sheen, film, or discoloration was observed as a result of the release of the water. Field testing and the WEG Results confirmed no environmental impacts from the release of the water.**

15. Describe any damage to animal life or vegetation that you observed or otherwise have knowledge of.

Response: No damage to animal life or vegetation was observed nor would any be expected from the release of water. Field testing and the WEG Results confirmed no environmental impacts from the water release.

16. List the name, address, telephone number, and affiliation of any and all persons who made any observations in response to Questions 14 and 15.

Response: The water release was not a release of oil and did not reach any body of water or shoreline. No oil sheen, film, or discoloration was observed as a result of the release of water. No damage to animal life or vegetation was observed and none would be expected from a release of water. No environmental impacts occurred.

17. Identify the effect of the spill(s) on any water supply and give details if available (e.g., shutdown of public or private water supply). Provide the names and addresses of all persons that have been provided with an alternative water supply (e.g., bottled water) due to the spill or because of the threatened migration of contamination.

Response: The release of water did not affect any water supply, public or private. Therefore, it was not necessary to provide an alternative water supply to anyone as a result of the water release. Field testing and the WEG Results confirmed no environmental impacts from the release of water.

18. Does the facility have a National Pollutant Discharge Elimination System (NPDES) Permit or permit application? If yes, provide the permit number or, if no permit number has been issued at the time, the date upon which the application was filed.

Response: No. The Yeager Pad does not have an NPDES Permit as none is required by either Federal or Pennsylvania law.

19. If the substance(s) was discharged from an outfall, state whether the outfall was covered by an NPDES permit issued pursuant to Section 402 of the Act.

Response: The Yeager Pad does not have an NPDES Permit as none is required by either Federal or Pennsylvania law.

20. Identify all NPDES or state wastewater discharge permit conditions and/or water quality standards that may have been violated by the spill.

Response: The Yeager Pad does not have an NPDES Permit as none is required by either Federal or Pennsylvania law.

21. Provide a complete description of the cause or causes of the discharge (e.g., pump failure, by-pass of treatment system), as well as any other relevant circumstances. If the discharge was caused by the actions of a third party (for instance, as the result of an accident or vandalism), describe in detail the measures that were in place to prevent such actions. For vandalism, identify any enforcement agencies to which the owner or operator reported the vandalism.

Response: The release occurred when water from a Highland truck which had removed the water from the Yeager Pad was released from a pressure relief valve on the side of the Highland truck when water surged forward during the downhill drive and unseated a ball valve. Additionally, the driver had not entirely closed a manual valve. Preventive measures then-in-place included instructions to Highland to check the manual valve prior to leaving the pad. Such instructions were reiterated after the Yeager Pad water release.

22. Describe all steps taken to contain and clean up the spill(s) and to mitigate any environmental damage and/or threat to human health.

Response: The release, which was estimated to be approximately 20 gallons of filtered groundwater, was highly diluted by heavy rain/stormwater runoff. Field testing of pooled areas indicated that TDS and conductivity levels were not elevated. Nevertheless, as

a precaution, Range applied absorbent booms/pads and had WEG collect soil and water samples. The WEG Results did not reveal any environmental impacts. As such, there was no need to conduct any further clean up or to mitigate any environmental damage or threat to human health, as neither had occurred.

23. Describe any actions taken or planned to prevent the recurrence of incidents such as the release(s) identified above.

Response: Range reiterated to Highland to confirm the full closure of the manual valve on its trucks prior to departing a well pad site.

24. List the names, addresses, telephone numbers, and affiliations (*e.g.*, name of governmental agency, contractor, or other entity) of all persons who were on the scene during the incident and/or during cleanup operations, as well as any other persons not present but otherwise believed to have knowledge of the facts surrounding the incident or incidents. For each person identified in response to this question, provide the time period during which they were present at the facility. In responding to this question, for each complaint by an individual you have received related to your operations at the Facility, provide the person's name and phone number, as well as any written record of that complaint or a written narrative describing any oral complaint; Provide any subsequent communications with the party(ies) that filed the complaint.

Response: Various Range personnel, including Jeremy Matinko, were present.

25. Provide the date on which operations began at the Facility. Identify all Natural Gas Production Facilities (NGPFs) (as further defined in Enclosure 1) owned and/or operated by you connected to or otherwise associated with the Facility at any time. Identify all components of each NGPF, including but not limited to wells, piping, tanks, other equipment, and surface impoundments.

Response: See Responses to Inquiry Nos. 1, 2, 5 and 21.

26. Provide the name(s) and addressees) of the owner(s) of the Facility described above in Question 25. In doing so, for all production facilities identified in response to Question 25, state the date that the owner obtained ownership and/or control over the production facilities and provide all documents evidencing or relating to such ownership, operation or lease, including but not limited to purchase and sale agreements, deeds, and leases.

Response: **Range is the owner and operator of and maintains control over the equipment and facilities pertinent to the Yeager Well Pad.**

27. Identify all drill pads and/or drill rigs owned and/or operated by you at or within 10 miles of the Facility at any time. For each drill pad and/or drill rig, identify the year on which that drill pad and/or rig was installed at its present location and any past location.

Response: **Range operates several wells located on and within 10 miles of the Yeager Pad. All of these wells are being drilled or have been drilled into the Marcellus Shale.**

28. Provide the name and address of the operator(s) of the Facility described above in Question 25 and describe the relationship between the owner(s) and operator(s) (*i.e.*, employee, subcontractor, lessee, etc.). Identify any persons who concurrently with you exercised actual control or who held significant authority to control activities at the Facility at any time. In answering this question, include:
- a. Partners and/or joint ventures;
 - b. Every contractor, subcontractor, or licensor with any presence or activity at the Facility (e.g., service contractors, remediation contractors, management and operator contractors, licensor providing technical support for licensed activities);
 - c. All persons who exercised actual control over any activities or operations at the Facility; .
 - d. All persons who held significant authority to control any activities or operations at the Facility;
 - e. All persons who had a significant presence or who conducted significant activities at the Facility;
 - f. All government entities that had proprietary (as opposed to regulatory) interest or involvement with regard to the activity at the Facility.

Response: ***See responses above.***

29. Identify all prior owners and operators of the production facilities identified in response to Question 25 and the drill pads identified in response to Question 27. For each prior owner/operator, identify:
- a. The dates of installation, ownership, and/or operation;
 - b. All evidence of the activities that were conducted at the production facilities and drill pads at that time, including but not limited to any

- information about wells installed, operated, and/or decommissioned during any period of prior ownership/operation;
- c. All integrity test results, materials inventories, and/or notifications and reports made to and received from local, state, and federal authorities; and
 - d. Any information you have access to regarding the substances used in connection with the production facilities during any period of prior ownership/operation.

Response: **Range owns and operates the natural gas wells identified in**

Question 27. There are no prior owners/operators of these wells.

30. Describe the nature of the work conducted by you at each NGPF identified in response to Question 25. For each NGPF owned or operated by you, provide information on the installation, operation, and maintenance of those production facilities. Your response should include, but not be limited to the following for each well:
- a. The name or identifier of each well;
 - b. Well construction information (including specifications on casing depths, cement tops/bottoms, and perforated zones);
 - c. Well maintenance information (including logs and inspection records);
 - d. Well incident information (including fluid loss during drilling or storage, cement loss, problems during hydraulic fracturing or other operations). Provide any root cause analysis conducted and corrective actions taken in response;
 - e. Well lithologic logs (also known as “mud logs”); and
 - f. The constituents contained in as well as the quantities of those constituents in any produced water, brine and/or, any other fluids associated with those wells.

Response: **See Responses to Inquiry No. 25.**

31. Identify any contractors used by you that conducted any activities related to the wells identified in response to Question 30. For each contractor, identify:
- a. The dates that they conducted work;
 - b. The nature of the work they conducted.

Response: **See Responses to Inquiry No. 25.**

32. Identify any other leaks, spills, or releases of oil and/or hazardous substances into the environment that have occurred from the Facility. For each such release, provide the following:
- a. date;
 - b. duration of the release;

- c. substance(s) released;
- d. the approximate quantity of the substance(s) released;
- e. the origin of the release;
- f. the cause of the release;
- g. the location of the release;
- h. any and all activities undertaken in response to each such release or threatened release, including the notification of any agencies or governmental units about the release;
- i. The result of any and all investigations of the circumstances, nature, extent or location of the release or threatened release, including the results of any soil and water (ground and surface) testing undertaken;
- j. Whether any persons were provided with an alternative water supply; and
- k. All persons with information related to these releases.

Response: **There have been no Federal reportable quantity releases on the Yeager Well Pad.**

33. Provide any other reports, information or data related to activities conducted at or near the wells by you, your predecessors, contractors, and/or any other entity.

Response: **The following documents are attached: (1) the Report (at Tab 1) and the WEG Results (at Tab 2).**

34. Provide a complete inventory of any compounds used at all NGPFs identified in response to Question 25. Include the chemical composition, characteristics, physical state of each compound, along with the MSDSs, CAS Numbers, and product names.

Response: **See Response to Inquiry No. 1.**

35. Provide all documents, reports, information, or data collected related to the substances placed into and taken from the wells possessed by you or any party related to you by contract or otherwise. Your response should include, but not be limited to:
- a. Analysis of production water constituents;
 - b. Analysis of condensate constituents;
 - c. Drilling fluid components (Material Safety Data Sheets (MSDSs), Chemical Abstract Systems (CAS) Numbers, product names;
 - d. Water/geochemistry analysis from discrete production zones.
 - e. Provide the following information (including any reports that include such information) related to the injection of substances into the wells by you or any other person, including but not limited to:

- f. Hydraulic fracturing fluid components (including MSDS, CAS Number, product names);
- g. Workover fluids (including all underlying components of workover fluids) (including MSDS, CAS Number, product names);
- h. Formation fracturing records for wells (including the depths and dates).

Response: **See Response to Inquiry No. 1.**

36. Provide all reports, data or other information related to soil, water (ground and surface) and geology/hydrogeology at and around the Site. Provide copies of all documents containing such data or information, including past and present aerial photographs as well as documents containing the basis for and/or analysis or interpretation of that data or other information.

Response: **Range is not aware of any responsive information other than that which is included at Tabs 1 and 2.**

37. Describe the storage units at the Facility (e.g., above ground tanks or underground tanks) and provide the types of substance(s) stored and the total storage capacity of each storage unit by name and CAS number. In answering this question, include substances and capacities of "oil-filled equipment" and "mobile refuelers" that are defined in *Enclosure 1*. Identify the storage units and provide the storage capacity of each unit identified with each NGPF and identify the types of substance(s) stored and the total storage capacity of each storage unit by name and CAS number for those units. In responding to this question, indicate whether each substance is an oil and/or a hazardous substance.

Response: **No aboveground or underground tanks were involved.**

38. Has any contaminated soil ever been excavated or removed from areas around or near the wells? If so, provide the following:
- a. Amount of soil excavated;
 - b. The substances contained in the excavated soil;
 - c. Location of excavation;
 - d. Distance from a navigable water of the United States or an adjoining shoreline;
 - e. Description of the pathway from the excavated soil area to a navigable water of the US or an adjoining shoreline, including topography and an analysis of whether the materials could reach a navigable water or adjoining shoreline;
 - f. Any information, including data, maps, and reports, related to any plume of substances associated with any soil excavation.

Response: No soils were excavated in connection with the discharge. In connection with other activities on the Yeager Pad, some soils may have been excavated.

39. If the Owner or Operator has in place a Spill Prevention, Control and Countermeasures ("SPCC") Plan pursuant to 40 C.F.R. Part 112, a Facility Response Plan ("FRP") prepared pursuant to 40 C.F.R. § 112.20, a state oil spill prevention plan, and/or some other spill prevention plan, provide EPA with a copy of all such plans. Please indicate whether a professional engineer prepared and/or certified any plan in place at the Facility. In the event the plan is undated, provide the date(s) on which the plan was prepared and implemented.

Response: As of the date of the water release, a PPC Plan existed. A copy is attached at Tab 3.

40. Provide a description of all procedures used to prevent and/or contain spills of substances from the Facility. This description should indicate the tanks, tank cars, tank trucks, or other equipment that are protected by dikes, the amount of material that can be contained by each dike, and the number of tanks, tank cars, tank trucks, and other equipment protected by each dike.

Response: See Responses to Inquiry Nos. 23 and 40. A copy of the applicable erosion and sedimentation plan is attached at Tab 4.

41. Indicate the material used to construct each dike and the condition of each dike listed in Question 40.

Response: See responses to Inquiry No. 40.

42. In the event that the Owner or Operator does not have in place a SPCC Plan, FRP or state oil prevention plan, describe any actions taken or proposed to prevent the recurrence of any spill identified in response to Question 1.

Response: As of the date of the water release, a PPC Plan existed. A copy is attached at Tab 3.

43. List any other information you wish to bring to the attention of the federal government at this time related to this matter.

Response: See responses above.



RANGE RESOURCES

March 29, 2011

Mr. Vince Yantko
Pennsylvania Department of Environmental Protection
California District Office
25 Technology Drive
Coal Center, Pennsylvania 15423

Dear Mr. Yantko:

Subject: Incident Report
Range Resources – Appalachia LLC
Yeager Unit Well Nos. 1H, 2H, and 7H
Well Permit Nos. 37-125-24314, 37-125-24315, and 37-125-23824
Amwell Township, Washington County, Pennsylvania

Range Resources – Appalachia, LLC (Range Resources) is submitting this letter as an incident report regarding the incident that occurred in conjunction with the drilling operations on the Yeager Unit Well Nos. 1H and 2H in Amwell Township, Washington County, Pennsylvania. The Yeager Unit Well Nos. 1H and 2H are permitted by the Pennsylvania Department of Environmental Protection (PADEP) Bureau of Oil & Gas Management under Permit Nos. 37-125-24314 and 37-125-24315, respectively. Also on this well pad is the Yeager Unit Well No. 7H (Permit No. 37-125-23824) which was drilled and completed from September 2009 through December 2009. This submittal letter contains a description of the incident, including the cause of the incident and notifications that were made; the actions taken; and the actions to be taken to prevent a similar incident in the future.

On Thursday, March 10, 2011, Highland Environmental (Highland) was filtering groundwater encountered while drilling the vertical section of the well with an air rig to 50 micron from the reserve pit on the Yeager well pad. The water was tested using a field meter and was found to have a TDS of 9,200 ppm and conductivity of 8,200 uS. After filtering the water, Highland was loading their water trucks and hauling the water off-site for reuse. When Highland loaded the truck with the filtered water and started off site, approximately 20 gallons of filtered water was released from the pressure relief valve on the driver side of the truck. This pressure relief valve consists of a manual valve which is operated by the driver and an internal ball valve in the surge tank. The internal ball valve prevents the tank from bursting or imploding when loading and unloading the truck by allowing air pressure in the tank to equalize. The water was released from the tank near the bottom of a downhill grade due to the fact that the water surged forward during the downhill drive and unseated the ball valve and due to the fact that the driver of the truck had not closed the manual valve when he finished loading the truck with water. If the manual valve had been closed by the driver, the release of water would not have occurred.

Approximately 20 gallons of water was determined to have been released. This volume was determined based on the level of water in the sight glass on the back of the tanker. The water, when released from the truck, ran down the access road and across McAdams Road. The

Range Resources – Appalachia LLC

380 Southpointe Blvd Suite 300 Canonsburg, PA 15317 Tel: (724) 743-6700 Fax: (724) 743-6790

Mr. Vince Yantko
Pennsylvania Department of Environmental Protection
March 23, 2011
Page 2

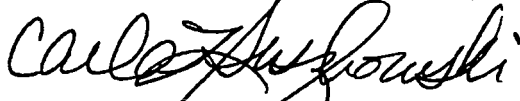
water was heavily diluted due to the heavy rain that was occurring at the time and the stormwater runoff coming down McAdams road from the rainfall event. When Range Resources safety personnel arrived on site, absorbent pads/booms had been put down by Highland as an added precaution. Areas where water was pooled were tested with field meters for TDS and conductivity, but none of the water testing indicated elevated levels of TDS or conductivity. As a result, no cleanup was necessary. Range Resources personnel notified DEP as required by our Preparedness, Prevention, and Contingency (PPC) Plan within a 2 hour window of the time of the incident. Weavertown Environmental was called out to take soil samples and a water sample to verify that there was no residual impact from the spill. When the analytical results are received by Range Resources, we will forward them to the DEP.

To prevent a similar incident in the future, Range Resources has consulted with all of its water hauling companies and reminded them that they need to check the manual valves and make certain that they are closed before hauling water from any site.

If you have any questions, or require any additional information, please call me.

Very truly yours,

RANGE RESOURCES - APPALACHIA, LLC



Carla L. Suszkowski, P.E.
Director, Regulatory and Environmental

cc: Jack Crook, PADEP Southwest Regional Office



WEG

Weavertown Environmental Group covers it all.

www.weavertown.com

24
365
7

Range Resources Post Remediation Summary Report

Prepared For:

Range Resources – Appalachia, LLC
2300 North Main Street
Washington, PA 15301

April 4, 2011

Prepared By:

Weavertown Environmental Group
2 Dorrington Road
Carnegie, PA 15106

Sample Site:

Yeager Unit 1-3H

Pennsylvania
Kentucky
Ohio
West Virginia

2 Dorrington Road • Carnegie, PA 15106 • Tel 724-746-4850 • Fax 412-429-0219

1.0 INTRODUCTION AND FIELD ACTIVITIES

A twenty gallon brine water release from the back of a vacuum truck occurred at the entrance to the Yeager Unit 1-3H site on March 10, 2011. Weavertown Environmental Group (WEG) was notified of the release and mobilized at 12:30 p.m. March 10, 2011 with a Project Supervisor and an Environmental Scientist. The impacted ground surface consisted of the entry way to the Yeager well site and a cow field across McAdams Road. Potential contamination in the cow field was estimated to be approximately 70 feet long by 50 feet wide. The extent of the spill was based on field screening through visual evidence by Range Resources employees. WEG was on site from 1:00 p.m. March 10, 2011 to 3:00 p.m. March 10, 2011 for the entire sampling event.

2.0 POST REMEDIATION SOIL SAMPLING METHODS

The Environmental Scientist from WEG conducted the water and soil sampling at the Yeager Unit 1-3H site on March 10, 2011. A water sample was collected to check for contamination in standing water in the cow field where the brine water was likely to mix. Two categories of soil samples were collected and identified as: background and potentially impacted soils. The object of the sampling for this project was to collect representative samples of the soils and water for laboratory analysis to ensure further excavation is not needed. The descriptions of the sample types and methods are included to aid in interpreting the analytical results.

Each time a soil sample was collected, a Soil Sample Collection Log and Site Map were completed to record relevant observations and procedures. The Soil Sample Collection Logs and Site Maps are displayed in Appendix A.

The sampling instrument was thoroughly decontaminated after each sampling point to prevent cross contamination of the samples. The instrument was cleaned with Alconox or a similar detergent and rinsed with distilled water at least three times or until there was no longer any detectable debris remaining.

- **Water Samples – One Water Sample** was collected from a four inch pool of water towards the center of the impacted area. The water was sampled because of the possibility of brine water mixing with the standing water in the cow field. Sample glassware was filled above the lid, to ensure no air bubbles were trapped inside, and preserved with ice.
- **Background Sample – One Background Sample** was collected from a non-impacted area away from the release. This sample was used to compare and contrast the impacted soil results with non-impacted soils at the site. A hand trowel was used to remove the top layer of vegetation and collect the sample to a depth of approximately six inches. The samples were placed directly into laboratory glassware and preserved.

- **Impacted Soil Samples – Three Soil Samples** were collected from areas down hill of the release that had potentially impacted soil. A knowledgeable Range Resources employee visually scanned the impacted area and decided on three different areas to sample. The samples were collected at a depth of approximately 6 inches, placed directly into laboratory glassware and preserved.

3.0 RESULTS

Analytes with concentrations above the Practical Quantitation Limit (PQL) are presented in Table 3.1 for background samples and post-excavation samples. A table for the water sample, WS-01, is not included because the Target Compound List (TCL) found no analytes above the PQL present in the sample.

Results that report concentrations between the PQL and the Minimum Detection Limit (MDL) are displayed for analytes that have at least one sample result above the PQL. The MDL describes the level of detection that the analyst was able to achieve with confidence that the analyte was present in the sample but not a high enough concentration to be quantifiable due to instrument background "noise". Samples were sent to Microseeps Laboratory in Pittsburgh, PA under standard Chain of Custody protocol. Laboratory reports with analytical results are included in Appendix B.

Table 3.1 Concentrations of contaminants above the Practical Quantitation Limit for the background and impacted soil sampling at Yeager Unit 1-3H site on March 10, 2011.

Analyte	B-01	S-01	S-02	S-03
Chloride	2.2 mg/L*	3.3 mg/L	3.2 mg/L	2 mg/L*
Arsenic	6.2 mg/Kg	8.2 mg/Kg	8.6 mg/Kg	8.3 mg/Kg
Barium	93 mg/Kg	120 mg/Kg	180 mg/Kg	130 mg/Kg
Chromium	16 mg/Kg	21 mg/Kg	21 mg/Kg	19 mg/Kg
Lead	20 mg/Kg	28 mg/Kg	35 mg/Kg	27 mg/Kg
2-Butanone	25 µg/Kg	27 µg/Kg	27 µg/Kg	41 µg/Kg
Acetone	88 µg/Kg	120 µg/Kg	120 µg/Kg	150 µg/Kg
Oil and Grease	260 mg/Kg	740 mg/Kg	930 mg/Kg	620 mg/Kg
TPH	180mg/Kg	500 mg/Kg	510 mg/Kg	490 mg/Kg

* - Indicates contaminant concentrations above the MDL but below the PQL.

Appendix A
Soil Collection Log & Site Map



24
SUN

Soil Sample Collection Log

WEG Project Number: E10660

Customer Number: NA

Date: 03-10-2011

Sample Number: WS-01

Company Name: Range Resources – Appalachia, LLC

Company Address: 2300 North Main Street Washington, PA 15301

Requested By: Jeremy Matinko

Phone Number: (724) 288-9542

Email: jmatinko@rangeresources.com

Site Information

Sampling Site Name/Well#: Yeager Unit 1-3H

Sample Site Location: 1152 McAdams Road Washington, PA 15301

Site Contact: Jessica Brennen

Phone: (724) 288-9506

Project Description: On March 10, 2011, a vacuum truck released twenty gallons of brine water at the entrance of the Yeager well site. The brine water flowed across the street into the neighboring cow field. A water sample was collected from a pool of water next to the pipe carrying runoff water from under the road. WS-01 was collected because of the possibility of brine water mixing with the standing water located in this area. The sample was collected in preserved vials and placed in a cooler full of ice.

Sampling Information

Sampling Observations and Notes: At the time of the sampling, the temperature was 45°F and raining. WS-01 was a dark, muddy water sample. No significant odors were detected and no visual signs of contamination were noticed.

Requested Analysis: Volatile Organic Compound Target Compound List (TLC)

Equipment Needed: Sampling Truck, Soil Sampling Equipment, Nitrile and Leather Gloves, Decontamination Materials, Appropriate PPE

Laboratory Utilized: Microseeps, Inc.



WEG

Wenatchee Environmental Group covers it all

24
3887

Soil Sample Collection Log

WEG Project Number: E10660 Customer Number: NA

Date: 03-10-2011

Sample Number: B-01

Company Name: Range Resources – Appalachia, LLC

Company Address: 2300 North Main Street Washington, PA 15301

Requested By: Jeremy Matinko Phone Number: (724) 288-9542

Email: jmatinko@rangeresources.com

Site Information

Sampling Site Name/Well#: Yeager Unit 1-3H

Sample Site Location: 1152 McAdams Road Washington, PA 15301

Site Contact: Jessica Brennen Phone: (724) 288-9506

Project Description: On March 10, 2011, a vacuum truck released twenty gallons of brine water at the entrance of the Yeager Unit 1-3H well site. The brine water flowed across the street into the neighboring cow field. One background sample was collected to contrast against the three potentially impacted soil samples. B-01 was collected in the cow field, south of the release.

Sampling Information

Sampling Observations and Notes: At the time of the sampling, the temperature was 45°F and raining. B-01 was a wet, brown, silty clay with grass sods throughout. No significant odors were detected and no visual signs of contamination were noticed

Requested Analysis: TPH, Oil and Grease, BTEX, pH, Chlorides, RCRA metals, Semi-volatiles, Volatiles, Sulfate, Ethylene Glycol, Sodium

Equipment Needed: Sampling Truck, Soil Sampling Equipment, Nitrile and Leather Gloves, Decontamination Materials, Appropriate PPE

Laboratory Utilized: Microseeps, Inc.



Soil Sample Collection Log

WEG Project Number: E10660 Customer Number: NA
Date: 03-10-2011
Sample Number: S-01
Company Name: Range Resources – Appalachia, LLC
Company Address: 2300 North Main Street Washington, PA 15301
Requested By: Jeremy Matinko Phone Number: (724) 288-9542
Email: jmatinko@rangeresources.com

Site Information

Sampling Site Name/Well#: Yeager Unit 1-3H
Sample Site Location: 1152 McAdams Road Washington, PA 15301
Site Contact: Jessica Brennen Phone: (724) 288-9506
Project Description: On March 10, 2011, a vacuum truck released twenty gallons of brine water at the entrance of the Yeager well site. The brine water flowed across the street into the neighboring cow field. S-01 was collected on the southern most boundary of where the release was likely to reach. It was collected as a grab sample from the top six inches of soil, placed in preserved laboratory glassware and put in a cooler full of ice.

Sampling Information

Sampling Observations and Notes: At the time of the sampling, the temperature was 45°F and raining. S-01 was a very wet, brown, silty clay with grass sods throughout. No significant odors were detected and no visual signs of contamination were noticed
Requested Analysis: TPH, Oil and Grease, BTEX, pH, Chlorides, RCRA metals, Semi-volatiles, Volatiles, Sulfate, Ethylene Glycol, Sodium
Equipment Needed: Sampling Truck, Soil Sampling Equipment, Nitrile and Leather Gloves, Decontamination Materials, Appropriate PPE
Laboratory Utilized: Microseeps, Inc.



24

Soil Sample Collection Log

WEG Project Number: E10660 Customer Number: NA
Date: 03-10-2011
Sample Number: S-02
Company Name: Range Resources – Appalachia, LLC
Company Address: 2300 North Main Street Washington, PA 15301
Requested By: Jeremy Matinko Phone Number: (724) 288-9542
Email: jmatinko@rangeresources.com

Site Information

Sampling Site Name/Well#: Yeager Unit 1-3H
Sample Site Location: 1152 McAdams Road Washington, PA 15301
Site Contact: Jessica Brennen Phone: (724) 288-9506
Project Description: On March 10, 2011, a vacuum truck released twenty gallons of brine water at the entrance of the Yeager well site. The brine water flowed across the street into the neighboring cow field. S-02 was collected on the northern most boundary of where the release was likely to reach. It was collected as a grab sample from the top six inches of soil, placed in preserved laboratory glassware and put in a cooler full of ice.

Sampling Information

Sampling Observations and Notes: At the time of the sampling, the temperature was 45°F and raining. S-02 was a wet, brown, silty clay with grass sods throughout. No significant odors were detected and no visual signs of contamination were noticed.
Requested Analysis: TPH, Oil and Grease, BTEX, pH, Chlorides, RCRA metals, Semi-volatiles, Volatiles, Sulfate, Ethylene Glycol, Sodium
Equipment Needed: Sampling Truck, Soil Sampling Equipment, Nitrile and Leather Gloves, Decontamination Materials, Appropriate PPE
Laboratory Utilized: Microseeps, Inc.



24
3887

Soil Sample Collection Log

WEG Project Number: E10660

Customer Number: NA

Date: 03-10-2011

Sample Number: S-03

Company Name: Range Resources – Appalachia, LLC

Company Address: 2300 North Main Street Washington, PA 15301

Requested By: Jeremy Matinko

Phone Number: (724) 288-9542

Email: jmatinko@rangeresources.com

Site Information

Sampling Site Name/Well#: Yeager Unit 1-3H

Sample Site Location: 1152 McAdams Road Washington, PA 15301

Site Contact: Jessica Brennen

Phone: (724) 288-9506

Project Description: On March 10, 2011, a vacuum truck released twenty gallons of brine water at the entrance of the Yeager well site. The brine water flowed across the street into the neighboring cow field. S-03 was collected in the area most down gradient of where the release was likely to reach. It was collected as a grab sample from the top six inches of soil, placed in preserved laboratory glassware and put in a cooler full of ice.

Sampling Information

Sampling Observations and Notes: At the time of the sampling, the temperature was 45°F and raining. S-03 was a very wet, brown, silty clay with grass sods throughout. No significant odors were detected and no visual signs of contamination were noticed

Requested Analysis: TPH, Oil and Grease, BTEX, pH, Chlorides, RCRA metals, Semi-volatiles, Volatiles, Sulfate, Ethylene Glycol, Sodium

Equipment Needed: Sampling Truck, Soil Sampling Equipment, Nitrile and Leather Gloves, Decontamination Materials, Appropriate PPE

Laboratory Utilized: Microseeps, Inc.



24

Soil Sample Collection Map

Project Number: E10660

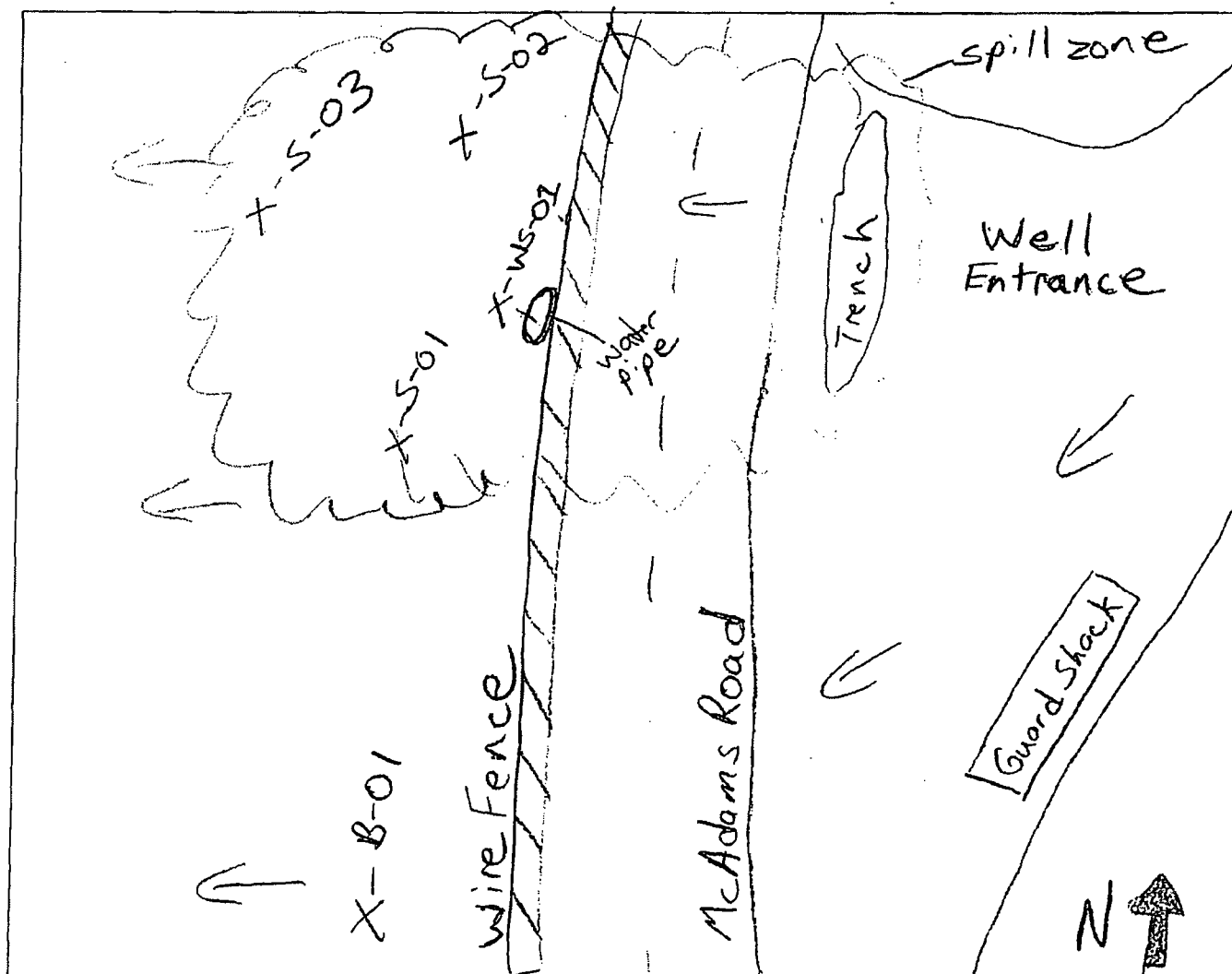
Date: 03-11-2011

Site Name: Yeager Unit 1-3H

Site Location: 1152 McAdams Road Washington, PA 15301

Additional Notes: Map is not drawn to scale

Site Map:



X - Sample Collected

Appendix B
Laboratory Reports with Analytical Results



Client Name: Weavertown Environmental Group
Contact: Mike McCaffrey
Address: 2 Dorrington Road
Carnegie, PA 15106

Page: Page 1 of 15
Lab Proj #: P1103109
Report Date: 03/30/11
Client Proj Name: Yeager
Client Proj #: E10660

Laboratory Results

Total pages in data package: 19

<u>Lab Sample #</u>	<u>Client Sample ID</u>
P1103109-01	B-01
P1103109-02	S-01
P1103109-03	S-02
P1103109-04	S-03
P1103109-05	WS-01

Microseeps test results meet all the requirements of the NELAC standards or provide reasons and/or justification if they do not.

Approved By: Heather Hauser RA **Date:** 3/30/11

Project Manager: Heather Hauser

The analytical results reported here are reliable and usable to the precision expressed in this report. As required by some regulating authorities, a full discussion of the uncertainty in our analytical results can be obtained at our web site or through customer service. Unless otherwise specified, all results are reported on a wet weight basis.

*As a valued client we would appreciate your comments on our service.
Please call customer service at (412)826-5245 or email customerservice@microseeps.com.*

Client Name: Weavertown Environmental Group
Contact: Mike McCaffrey
Address: 2 Dorrington Road
Carnegie, PA 15106

Page: Page 2 of 15
Lab Proj #: P1103109
Report Date: 03/30/11
Client Proj Name: Yeager
Client Proj #: E10660

Case Narrative: The ethylene glycol analyses were performed by Free-Col Laboratories, PA Lab ID-PA20-00073. See attached report. All analyses, with the exception of pH(1:1) and VOC's, were performed by Pace Analytical Services, PA Lab ID-PA65-282. The RPD on the duplicate sample analyses for total lead was outside of control limits. The percent recovery on the MS for 2,4-dinitrotoluene, 4-chloro-3-methylpheno and 4-nitrophenol were outside of control limits. The percent recovery on the MSD for 4-nitrophenol was outside of control limits. Sulfate was detected in the ASTM method blank below the reporting limit. The chloride and sulfate analyses were performed on an ASTM extraction. The percent recovery on the water batch volatiles MS/MSD for acetone, 2-butanone and carbon tetrachloride were outside of control limits. The percent recovery on the soil LCS for chlorobenzene and vinyl chloride were outside of control limits.



Data Qualifiers: J - estimated value, U - Non detect, R - Poor surrogate recovery, M - Recovery/RPD poor for MS/MSD, SAMP/DUP, B - detected in blank, S - field sample as received did not meet NELAC sample acceptance criteria, L - Subcontracted Lab used, N - NELAC certified analysis

MICROSEEPS

Client Name: Weavertown Environmental Group
 Contact: Mike McCaffrey
 Address: 2 Dorrington Road
 Carnegie, PA 15106

Page: Page 3 of 15
 Lab Proj #: P1103109
 Report Date: 03/30/11
 Client Proj Name: Yeager
 Client Proj #: E10660

Sample Description	Matrix	Lab Sample #	Sampled Date/Time	Received			
B-01	Water	P1103109-01	10 Mar. 11	11 Mar. 11 12:39			
Analyte(s)	Flag Result	PQL	MDL	Units	Method #	Analysis Date	By
WetChem							
Chloride	JL 2.2	3.0	0.2	mg/L	SM4500-Cl-E	3/16/11	pas
Sulfate	UL < 10.0	10.0	1.2	mg/L	D516-02	3/16/11	pas
Metals							
Arsenic	L 6.200	0.490	0.230	mg/Kg dry	6010B	3/28/11	pas
Barium	L 93.000	2.000	0.450	mg/Kg dry	6010B	3/28/11	pas
Cadmium	UL < 0.290	0.290	0.029	mg/Kg dry	6010B	3/28/11	pas
Chromium	L 16.000	0.490	0.039	mg/Kg dry	6010B	3/28/11	pas
Lead	L 20.000	0.490	0.180	mg/Kg dry	6010B	3/28/11	pas
Mercury	JL 0.02	0.15	0.0018	mg/Kg dry	7471	3/28/11	pas
Selenium	UL < 0.780	0.780	0.580	mg/Kg dry	6010B	3/28/11	pas
Silver	UL < 0.590	0.590	0.290	mg/Kg dry	6010B	3/28/11	pas
Sodium	UL < 520.000	520.000	260.000	mg/Kg dry	6010B	3/17/11	pas
Volatiles							
N 1,1,1-Trichloroethane	U < 11.0	11.0	0.4	ug/Kg dry	8260B	3/17/11	cs
N 1,1,2,2-Tetrachloroethane	U < 11.0	11.0	0.8	ug/Kg dry	8260B	3/17/11	cs
N 1,1,2-Trichloroethane	U < 11.0	11.0	0.5	ug/Kg dry	8260B	3/17/11	cs
N 1,1-Dichloroethane	U < 11.0	11.0	0.4	ug/Kg dry	8260B	3/17/11	cs
N 1,1-Dichloroethene	U < 11.0	11.0	0.2	ug/Kg dry	8260B	3/17/11	cs
N 1,2-Dichloroethane	U < 11.0	11.0	0.4	ug/Kg dry	8260B	3/17/11	cs
N 1,2-Dichloropropane	U < 11.0	11.0	0.4	ug/Kg dry	8260B	3/17/11	cs
N 2-Butanone	25.0	22.0	1.6	ug/Kg dry	8260B	3/17/11	cs
N 2-Hexanone	U < 22.0	22.0	0.4	ug/Kg dry	8260B	3/17/11	cs
N 4-Methyl-2-pentanone	U < 22.0	22.0	1.2	ug/Kg dry	8260B	3/17/11	cs
N Acetone	88.0	22.0	5.0	ug/Kg dry	8260B	3/17/11	cs
N Benzene	U < 11.0	11.0	0.3	ug/Kg dry	8260B	3/17/11	cs
N Bromodichloromethane	U < 11.0	11.0	0.3	ug/Kg dry	8260B	3/17/11	cs
N Bromoform	U < 11.0	11.0	0.5	ug/Kg dry	8260B	3/17/11	cs
N Bromomethane	U < 11.0	11.0	1.5	ug/Kg dry	8260B	3/17/11	cs
N Carbon Disulfide	U < 11.0	11.0	0.4	ug/Kg dry	8260B	3/17/11	cs
N Carbon tetrachloride	U < 11.0	11.0	0.4	ug/Kg dry	8260B	3/17/11	cs
N Chlorobenzene	U < 11.0	11.0	0.2	ug/Kg dry	8260B	3/17/11	cs
N Chloroethane	U < 11.0	11.0	0.5	ug/Kg dry	8260B	3/17/11	cs
N Chloroform	U < 11.0	11.0	0.4	ug/Kg dry	8260B	3/17/11	cs
N Chloromethane	U < 11.0	11.0	0.4	ug/Kg dry	8260B	3/17/11	cs
N cis-1,2-Dichloroethene	U < 11.0	11.0	0.4	ug/Kg dry	8260B	3/17/11	cs
N cis-1,3-Dichloropropene	U < 11.0	11.0	0.5	ug/Kg dry	8260B	3/17/11	cs
N Dibromochloromethane	U < 11.0	11.0	0.5	ug/Kg dry	8260B	3/17/11	cs
N Ethylbenzene	J 0.8	11.0	0.2	ug/Kg dry	8260B	3/17/11	cs
N m & p-Xylene	J 2.0	22.0	0.3	ug/Kg dry	8260B	3/17/11	cs
N Methylene Chloride	U < 22.0	22.0	0.4	ug/Kg dry	8260B	3/17/11	cs
N o-Xylene	J 0.6	11.0	0.2	ug/Kg dry	8260B	3/17/11	cs
N Styrene	U < 11.0	11.0	0.2	ug/Kg dry	8260B	3/17/11	cs
N Tetrachloroethene	U < 11.0	11.0	0.2	ug/Kg dry	8260B	3/17/11	cs
N Toluene	J 1.3	11.0	0.2	ug/Kg dry	8260B	3/17/11	cs
N trans-1,2-Dichloroethene	U < 11.0	11.0	0.4	ug/Kg dry	8260B	3/17/11	cs
N trans-1,3-Dichloropropene	U < 11.0	11.0	0.4	ug/Kg dry	8260B	3/17/11	cs



Data Qualifiers: J - estimated value, U - Non detect, R - Poor surrogate recovery, M - Recovery/RPD poor for MS/MSD, SAMP/DUP, B - detected in blank, S - field sample as received did not meet NELAC sample acceptance criteria, L - Subcontracted Lab used, N - NELAC certified analysis

MICROSEEPS

Client Name: Weavertown Environmental Group
 Contact: Mike McCaffrey
 Address: 2 Dorrington Road
 Carnegie, PA 15106

Page: Page 4 of 15
 Lab Proj #: P1103109
 Report Date: 03/30/11
 Client Proj Name: Yeager
 Client Proj #: E10660

Sample Description	Matrix	Lab Sample #	Sampled Date/Time	Received			
B-01	Solid	P1103109-01	10 Mar. 11	11 Mar. 11 12:39			
Analyte(s)	Flag Result	PQL	MDL	Units	Method #	Analysis Date	By
Volatiles							
N Trichloroethene	U < 11.0	11.0	0.2	ug/Kg dry	8260B	3/17/11	cs
N Vinyl Chloride	U < 11.0	11.0	0.5	ug/Kg dry	8260B	3/17/11	cs
Others							
Oil and Grease	L 260.00	150.00	40.00	mg/Kg dry	9071	3/16/11	pas
Percent Solids	L 66	0.1	0.1	%	D2974-87	3/15/11	pas
Total Petroleum Hydrocarbon	L 180.00	150.00	40.00	mg/Kg dry	9071	3/16/11	pas
SemiVolatiles							
1,2,4-Trichlorobenzene	UL < 490.0	490.0	840.0	ug/Kg dry	8270C	3/25/11	pas
1,2-Dichlorobenzene	UL < 490.0	490.0	95.0	ug/Kg dry	8270C	3/25/11	pas
1,3-Dichlorobenzene	UL < 490.0	490.0	100.0	ug/Kg dry	8270C	3/25/11	pas
1,4-Dichlorobenzene	UL < 490.0	490.0	190.0	ug/Kg dry	8270C	3/25/11	pas
2,4,5-Trichlorophenol	UL < 1200.0	1200.0	320.0	ug/Kg dry	8270C	3/25/11	pas
2,4,6-Trichlorophenol	UL < 490.0	490.0	130.0	ug/Kg dry	8270C	3/25/11	pas
2,4-Dichlorophenol	UL < 490.0	490.0	140.0	ug/Kg dry	8270C	3/25/11	pas
2,4-Dimethylphenol	UL < 490.0	490.0	120.0	ug/Kg dry	8270C	3/25/11	pas
2,4-Dinitrophenol	UL < 1200.0	1200.0	310.0	ug/Kg dry	8270C	3/25/11	pas
2,4-Dinitrotoluene	UL < 490.0	490.0	150.0	ug/Kg dry	8270C	3/25/11	pas
2,6-Dinitrotoluene	UL < 490.0	490.0	170.0	ug/Kg dry	8270C	3/25/11	pas
2-Chloronaphthalene	UL < 490.0	490.0	91.0	ug/Kg dry	8270C	3/25/11	pas
2-Chlorophenol	UL < 490.0	490.0	160.0	ug/Kg dry	8270C	3/25/11	pas
2-Methylnaphthalene	UL < 490.0	490.0	140.0	ug/Kg dry	8270C	3/25/11	pas
2-Methylphenol	UL < 490.0	490.0	840.0	ug/Kg dry	8270C	3/25/11	pas
2-Nitroaniline	UL < 1200.0	1200.0	180.0	ug/Kg dry	8270C	3/25/11	pas
2-Nitrophenol	UL < 490.0	490.0	140.0	ug/Kg dry	8270C	3/25/11	pas
3,3-Dichlorobenzidine	UL < 490.0	490.0	180.0	ug/Kg dry	8270C	3/25/11	pas
3-Nitroaniline	UL < 1200.0	1200.0	150.0	ug/Kg dry	8270C	3/25/11	pas
4,6-Dinitro-2-methylphenol	UL < 1200.0	1200.0	140.0	ug/Kg dry	8270C	3/25/11	pas
4-Bromophenyl phenyl ether	UL < 490.0	490.0	100.0	ug/Kg dry	8270C	3/25/11	pas
4-Chloro-3-methylphenol	UL < 490.0	490.0	230.0	ug/Kg dry	8270C	3/25/11	pas
4-Chloroaniline	UL < 490.0	490.0	100.0	ug/Kg dry	8270C	3/25/11	pas
4-Chlorophenylphenyl ether	UL < 490.0	490.0	120.0	ug/Kg dry	8270C	3/25/11	pas
4-Methylphenol	UL < 980.0	980.0	300.0	ug/Kg dry	8270C	3/25/11	pas
4-Nitroaniline	UL < 1200.0	1200.0	220.0	ug/Kg dry	8270C	3/25/11	pas
4-Nitrophenol	UL < 490.0	490.0	91.0	ug/Kg dry	8270C	3/25/11	pas
Acenaphthene	UL < 490.0	490.0	110.0	ug/Kg dry	8270C	3/25/11	pas
Acenaphthylene	UL < 490.0	490.0	90.0	ug/Kg dry	8270C	3/25/11	pas
Anthracene	UL < 490.0	490.0	72.0	ug/Kg dry	8270C	3/25/11	pas
Benzo(a)anthracene	UL < 490.0	490.0	78.0	ug/Kg dry	8270C	3/25/11	pas
Benzo(a)pyrene	UL < 490.0	490.0	72.0	ug/Kg dry	8270C	3/25/11	pas
Benzo(b)fluoranthene	UL < 490.0	490.0	70.0	ug/Kg dry	8270C	3/25/11	pas
Benzo(g,h,i)perylene	UL < 490.0	490.0	140.0	ug/Kg dry	8270C	3/25/11	pas
Benzo(k)fluoranthene	UL < 490.0	490.0	150.0	ug/Kg dry	8270C	3/25/11	pas
Bis(2-chloroethoxy)methane	UL < 490.0	490.0	110.0	ug/Kg dry	8270C	3/25/11	pas
Bis(2-chloroethyl)ether	UL < 490.0	490.0	210.0	ug/Kg dry	8270C	3/25/11	pas
Bis(2chloroisopropyl)ether	UL < 490.0	490.0	59.0	ug/Kg dry	8270C	3/25/11	pas
Bis(2-ethylhexyl)phthalate	UL < 490.0	490.0	62.0	ug/Kg dry	8270C	3/25/11	pas



Data Qualifiers: J - estimated value, U - Non detect, R - Poor surrogate recovery, M - Recovery/RPD poor for MS/MSD, SAMP/DUP, B - detected in blank, S - field sample as received did not meet NELAC sample acceptance criteria, L - Subcontracted Lab used, N - NELAC certified analysis

MICROSEEPS

Client Name: Weavertown Environmental Group
 Contact: Mike McCaffrey
 Address: 2 Dorrington Road
 Carnegie, PA 15106

Page: Page 5 of 15
 Lab Proj #: P1103109
 Report Date: 03/30/11
 Client Proj Name: Yeager
 Client Proj #: E10660

<u>Sample Description</u>	<u>Matrix</u>	<u>Lab Sample #</u>		<u>Sampled Date/Time</u>	<u>Received</u>			
B-01	Solid	P1103109-01		10 Mar. 11	11 Mar. 11 12:39			
<u>Analyte(s)</u>	<u>Flag</u>	<u>Result</u>	<u>PQL</u>	<u>MDL</u>	<u>Units</u>	<u>Method #</u>	<u>Analysis Date</u>	<u>By</u>
SemiVolatiles								
Butyl benzyl phthalate	UL	< 490.0	490.0	50.0	ug/Kg dry	8270C	3/25/11	pas
Chrysene	UL	< 490.0	490.0	160.0	ug/Kg dry	8270C	3/25/11	pas
Dibenz(a,h)anthracene	UL	< 490.0	490.0	140.0	ug/Kg dry	8270C	3/25/11	pas
Dibenzofuran	UL	< 490.0	490.0	120.0	ug/Kg dry	8270C	3/25/11	pas
Diethyl phthalate	UL	< 490.0	490.0	78.0	ug/Kg dry	8270C	3/25/11	pas
Dimethyl phthalate	UL	< 490.0	490.0	110.0	ug/Kg dry	8270C	3/25/11	pas
Di-n-butyl phthalate	UL	< 490.0	490.0	76.0	ug/Kg dry	8270C	3/25/11	pas
Di-n-octyl phthalate	UL	< 490.0	490.0	63.0	ug/Kg dry	8270C	3/25/11	pas
Fluoranthene	UL	< 490.0	490.0	86.0	ug/Kg dry	8270C	3/25/11	pas
Fluorene	UL	< 490.0	490.0	88.0	ug/Kg dry	8270C	3/25/11	pas
Hexachlorobenzene	UL	< 490.0	490.0	110.0	ug/Kg dry	8270C	3/25/11	pas
Hexachlorobutadiene	UL	< 490.0	490.0	120.0	ug/Kg dry	8270C	3/25/11	pas
Hexachlorocyclopentadiene	UL	< 490.0	490.0	84.0	ug/Kg dry	8270C	3/25/11	pas
Hexachloroethane	UL	< 490.0	490.0	130.0	ug/Kg dry	8270C	3/25/11	pas
Indeno(1,2,3-cd)pyrene	UL	< 490.0	490.0	240.0	ug/Kg dry	8270C	3/25/11	pas
Isophorone	UL	< 490.0	490.0	76.0	ug/Kg dry	8270C	3/25/11	pas
Naphthalene	UL	< 490.0	490.0	62.0	ug/Kg dry	8270C	3/25/11	pas
Nitrobenzene	UL	< 490.0	490.0	140.0	ug/Kg dry	8270C	3/25/11	pas
N-Nitroso-di-n-propylamine	UL	< 490.0	490.0	130.0	ug/Kg dry	8270C	3/25/11	pas
N-Nitrosodiphenylamine	UL	< 490.0	490.0	94.0	ug/Kg dry	8270C	3/25/11	pas
Pentachlorophenol	UL	< 1200.0	1200.0	130.0	ug/Kg dry	8270C	3/25/11	pas
Phenanthrene	UL	< 490.0	490.0	86.0	ug/Kg dry	8270C	3/25/11	pas
Phenol	UL	< 490.0	490.0	120.0	ug/Kg dry	8270C	3/25/11	pas
Pyrene	UL	< 490.0	490.0	90.0	ug/Kg dry	8270C	3/25/11	pas



Data Qualifiers: J - estimated value, U - Non detect, R - Poor surrogate recovery, M - Recovery/RPD poor for MS/MSD, SAMP/DUP, B - detected in blank, S - field sample as received did not meet NELAC sample acceptance criteria, L - Subcontracted Lab used, N - NELAC certified analysis

MICROSEEPS

Client Name: Weavertown Environmental Group
 Contact: Mike McCaffrey
 Address: 2 Dorrington Road
 Carnegie, PA 15106

Page: Page 6 of 15
 Lab Proj #: P1103109
 Report Date: 03/30/11
 Client Proj Name: Yeager
 Client Proj #: E10660

Sample Description	Matrix	Lab Sample #	Sampled Date/Time		Received			
S-01	Water	P1103109-02	10 Mar. 11		11 Mar. 11 12:39			
Analyte(s)	Flag	Result	PQL	MDL	Units	Method #	Analysis Date	By
WetChem								
Chloride	L	3.3	3.0	0.2	mg/L	SM4500-Cl-E	3/16/11	pas
Sulfate	UL	< 10.0	10.0	1.2	mg/L	D516-02	3/16/11	pas
Metals								
Arsenic	L	8.200	0.460	0.210	mg/Kg dry	6010B	3/28/11	pas
Barium	L	120.000	1.800	0.420	mg/Kg dry	6010B	3/28/11	pas
Cadmium	UL	< 0.270	0.270	0.027	mg/Kg dry	6010B	3/28/11	pas
Chromium	L	21.000	0.460	0.037	mg/Kg dry	6010B	3/28/11	pas
Lead	L	28.000	0.460	0.160	mg/Kg dry	6010B	3/28/11	pas
Mercury	JL	0.04	0.14	0.0017	mg/Kg dry	7471	3/28/11	pas
Selenium	UL	< 0.730	0.730	0.540	mg/Kg dry	6010B	3/28/11	pas
Silver	UL	< 0.550	0.550	0.270	mg/Kg dry	6010B	3/28/11	pas
Sodium	UL	< 550.000	550.000	280.000	mg/Kg dry	6010B	3/17/11	pas
Volatiles								
N 1,1,1-Trichloroethane	U	< 11.0	11.0	0.4	ug/Kg dry	8260B	3/17/11	CS
N 1,1,2,2-Tetrachloroethane	U	< 11.0	11.0	0.8	ug/Kg dry	8260B	3/17/11	CS
N 1,1,2-Trichloroethane	U	< 11.0	11.0	0.5	ug/Kg dry	8260B	3/17/11	CS
N 1,1-Dichloroethane	U	< 11.0	11.0	0.4	ug/Kg dry	8260B	3/17/11	CS
N 1,1-Dichloroethene	U	< 11.0	11.0	0.2	ug/Kg dry	8260B	3/17/11	CS
N 1,2-Dichloroethane	U	< 11.0	11.0	0.4	ug/Kg dry	8260B	3/17/11	CS
N 1,2-Dichloropropane	U	< 11.0	11.0	0.4	ug/Kg dry	8260B	3/17/11	CS
N 2-Butanone		27.0	22.0	1.6	ug/Kg dry	8260B	3/17/11	CS
N 2-Hexanone	U	< 22.0	22.0	0.4	ug/Kg dry	8260B	3/17/11	CS
N 4-Methyl-2-pentanone	U	< 22.0	22.0	1.2	ug/Kg dry	8260B	3/17/11	CS
N Acetone		120.0	22.0	5.0	ug/Kg dry	8260B	3/17/11	CS
N Benzene	J	1.8	11.0	0.3	ug/Kg dry	8260B	3/17/11	CS
N Bromodichloromethane	U	< 11.0	11.0	0.3	ug/Kg dry	8260B	3/17/11	CS
N Bromoform	U	< 11.0	11.0	0.5	ug/Kg dry	8260B	3/17/11	CS
N Bromomethane	U	< 11.0	11.0	1.5	ug/Kg dry	8260B	3/17/11	CS
N Carbon Disulfide	J	8.5	11.0	0.4	ug/Kg dry	8260B	3/17/11	CS
N Carbon tetrachloride	U	< 11.0	11.0	0.4	ug/Kg dry	8260B	3/17/11	CS
N Chlorobenzene	U	< 11.0	11.0	0.2	ug/Kg dry	8260B	3/17/11	CS
N Chloroethane	U	< 11.0	11.0	0.5	ug/Kg dry	8260B	3/17/11	CS
N Chloroform	U	< 11.0	11.0	0.4	ug/Kg dry	8260B	3/17/11	CS
N Chloromethane	U	< 11.0	11.0	0.4	ug/Kg dry	8260B	3/17/11	CS
N cis-1,2-Dichloroethene	U	< 11.0	11.0	0.4	ug/Kg dry	8260B	3/17/11	CS
N cis-1,3-Dichloropropene	U	< 11.0	11.0	0.5	ug/Kg dry	8260B	3/17/11	CS
N Dibromochloromethane	U	< 11.0	11.0	0.5	ug/Kg dry	8260B	3/17/11	CS
N Ethylbenzene	J	1.0	11.0	0.2	ug/Kg dry	8260B	3/17/11	CS
N m & p-Xylene	J	3.6	22.0	0.3	ug/Kg dry	8260B	3/17/11	CS
N Methylene Chloride	U	< 22.0	22.0	0.4	ug/Kg dry	8260B	3/17/11	CS
N o-Xylene	J	1.0	11.0	0.2	ug/Kg dry	8260B	3/17/11	CS
N Styrene	U	< 11.0	11.0	0.2	ug/Kg dry	8260B	3/17/11	CS
N Tetrachloroethene	J	0.7	11.0	0.2	ug/Kg dry	8260B	3/17/11	CS
N Toluene	J	5.4	11.0	0.2	ug/Kg dry	8260B	3/17/11	CS
N trans-1,2-Dichloroethene	U	< 11.0	11.0	0.4	ug/Kg dry	8260B	3/17/11	CS
N trans-1,3-Dichloropropene	U	< 11.0	11.0	0.4	ug/Kg dry	8260B	3/17/11	CS



Data Qualifiers: J - estimated value, U - Non detect, R - Poor surrogate recovery, M - Recovery/RPD poor for MS/MSD, SAMP/DUP, B - detected in blank, S - field sample as received did not meet NELAC sample acceptance criteria, L - Subcontracted Lab used, N - NELAC certified analysis

MICROSEEPS

Client Name: Weavertown Environmental Group
 Contact: Mike McCaffrey
 Address: 2 Dorrington Road
 Carnegie, PA 15106

Page: Page 7 of 15
 Lab Proj #: P1103109
 Report Date: 03/30/11
 Client Proj Name: Yeager
 Client Proj #: E10660

Sample Description	Matrix	Lab Sample #	Sampled Date/Time	Received				
S-01	Solid	P1103109-02	10 Mar. 11	11 Mar. 11 12:39				
Analyte(s)	Flag	Result	PQL	MDL	Units	Method #	Analysis Date	By
Volatiles								
N Trichloroethene	U	< 11.0	11.0	0.2	ug/Kg dry	8260B	3/17/11	cs
N Vinyl Chloride	U	< 11.0	11.0	0.5	ug/Kg dry	8260B	3/17/11	cs
Others								
Oil and Grease	L	740.00	150.00	40.00	mg/Kg dry	9071	3/16/11	pas
Percent Solids	L	66	0.1	0.1	%	D2974-87	3/15/11	pas
Total Petroleum Hydrocarbon	L	500.00	150.00	40.00	mg/Kg dry	9071	3/16/11	pas
SemiVolatiles								
1,2,4-Trichlorobenzene	UL	< 500.0	500.0	86.0	ug/Kg dry	8270C	3/25/11	pas
1,2-Dichlorobenzene	UL	< 500.0	500.0	98.0	ug/Kg dry	8270C	3/25/11	pas
1,3-Dichlorobenzene	UL	< 500.0	500.0	110.0	ug/Kg dry	8270C	3/25/11	pas
1,4-Dichlorobenzene	UL	< 500.0	500.0	190.0	ug/Kg dry	8270C	3/25/11	pas
2,4,5-Trichlorophenol	UL	< 1300.0	1300.0	320.0	ug/Kg dry	8270C	3/25/11	pas
2,4,6-Trichlorophenol	UL	< 500.0	500.0	130.0	ug/Kg dry	8270C	3/25/11	pas
2,4-Dichlorophenol	UL	< 500.0	500.0	150.0	ug/Kg dry	8270C	3/25/11	pas
2,4-Dimethylphenol	UL	< 500.0	500.0	120.0	ug/Kg dry	8270C	3/25/11	pas
2,4-Dinitrophenol	UL	< 1300.0	1300.0	320.0	ug/Kg dry	8270C	3/25/11	pas
2,4-Dinitrotoluene	UL	< 500.0	500.0	150.0	ug/Kg dry	8270C	3/25/11	pas
2,6-Dinitrotoluene	UL	< 500.0	500.0	180.0	ug/Kg dry	8270C	3/25/11	pas
2-Chloronaphthalene	UL	< 500.0	500.0	94.0	ug/Kg dry	8270C	3/25/11	pas
2-Chlorophenol	UL	< 500.0	500.0	170.0	ug/Kg dry	8270C	3/25/11	pas
2-Methylnaphthalene	UL	< 500.0	500.0	150.0	ug/Kg dry	8270C	3/25/11	pas
2-Methylphenol	UL	< 500.0	500.0	86.0	ug/Kg dry	8270C	3/25/11	pas
2-Nitroaniline	UL	< 1300.0	1300.0	180.0	ug/Kg dry	8270C	3/25/11	pas
2-Nitrophenol	UL	< 500.0	500.0	140.0	ug/Kg dry	8270C	3/25/11	pas
3,3-Dichlorobenzidine	UL	< 500.0	500.0	180.0	ug/Kg dry	8270C	3/25/11	pas
3-Nitroaniline	UL	< 1300.0	1300.0	150.0	ug/Kg dry	8270C	3/25/11	pas
4,6-Dinitro-2-methylphenol	UL	< 1300.0	1300.0	140.0	ug/Kg dry	8270C	3/25/11	pas
4-Bromophenyl phenyl ether	UL	< 500.0	500.0	110.0	ug/Kg dry	8270C	3/25/11	pas
4-Chloro-3-methylphenol	UL	< 500.0	500.0	240.0	ug/Kg dry	8270C	3/25/11	pas
4-Chloroaniline	UL	< 500.0	500.0	100.0	ug/Kg dry	8270C	3/25/11	pas
4-Chlorophenylphenyl ether	UL	< 500.0	500.0	120.0	ug/Kg dry	8270C	3/25/11	pas
4-Methylphenol	UL	< 1000.0	1000.0	310.0	ug/Kg dry	8270C	3/25/11	pas
4-Nitroaniline	UL	< 1300.0	1300.0	230.0	ug/Kg dry	8270C	3/25/11	pas
4-Nitrophenol	UL	< 500.0	500.0	94.0	ug/Kg dry	8270C	3/25/11	pas
Acenaphthene	UL	< 500.0	500.0	120.0	ug/Kg dry	8270C	3/25/11	pas
Acenaphthylene	UL	< 500.0	500.0	92.0	ug/Kg dry	8270C	3/25/11	pas
Anthracene	UL	< 500.0	500.0	74.0	ug/Kg dry	8270C	3/25/11	pas
Benzo(a)anthracene	UL	< 500.0	500.0	80.0	ug/Kg dry	8270C	3/25/11	pas
Benzo(a)pyrene	UL	< 500.0	500.0	74.0	ug/Kg dry	8270C	3/25/11	pas
Benzo(b)fluoranthene	UL	< 500.0	500.0	72.0	ug/Kg dry	8270C	3/25/11	pas
Benzo(g,h,i)perylene	UL	< 500.0	500.0	150.0	ug/Kg dry	8270C	3/25/11	pas
Benzo(k)fluoranthene	UL	< 500.0	500.0	150.0	ug/Kg dry	8270C	3/25/11	pas
Bis(2-chloroethoxy)methane	UL	< 500.0	500.0	110.0	ug/Kg dry	8270C	3/25/11	pas
Bis(2-chloroethyl)ether	UL	< 500.0	500.0	220.0	ug/Kg dry	8270C	3/25/11	pas
Bis(2chloroisopropyl)ether	UL	< 500.0	500.0	60.0	ug/Kg dry	8270C	3/25/11	pas
Bis(2-ethylhexyl)phthalate	UL	< 500.0	500.0	63.0	ug/Kg dry	8270C	3/25/11	pas



Data Qualifiers: J - estimated value, U - Non detect, R - Poor surrogate recovery, M - Recovery/RPD poor for MS/MSD, SAMP/DUP, B - detected in blank, S - field sample as received did not meet NELAC sample acceptance criteria, L - Subcontracted Lab used, N - NELAC certified analysis

MICROSEEPS

Client Name: Weavertown Environmental Group
 Contact: Mike McCaffrey
 Address: 2 Dorrington Road
 Carnegie, PA 15106

Page: Page 8 of 15
 Lab Proj #: P1103109
 Report Date: 03/30/11
 Client Proj Name: Yeager
 Client Proj #: E10660

<u>Sample Description</u>	<u>Matrix</u>	<u>Lab Sample #</u>		<u>Sampled Date/Time</u>		<u>Received</u>	
S-01	Solid	P1103109-02		10 Mar. 11		11 Mar. 11 12:39	
<u>Analyte(s)</u>	<u>Flag Result</u>	<u>PQL</u>	<u>MDL</u>	<u>Units</u>	<u>Method #</u>	<u>Analysis Date</u>	<u>By</u>
<u>SemiVolatiles</u>							
Butyl benzyl phthalate	UL < 500.0	500.0	51.0	ug/Kg dry	8270C	3/25/11	pas
Chrysene	UL < 500.0	500.0	170.0	ug/Kg dry	8270C	3/25/11	pas
Dibenz(a,h)anthracene	UL < 500.0	500.0	140.0	ug/Kg dry	8270C	3/25/11	pas
Dibenzofuran	UL < 500.0	500.0	120.0	ug/Kg dry	8270C	3/25/11	pas
Diethyl phthalate	UL < 500.0	500.0	80.0	ug/Kg dry	8270C	3/25/11	pas
Dimethyl phthalate	UL < 500.0	500.0	120.0	ug/Kg dry	8270C	3/25/11	pas
Di-n-butyl phthalate	UL < 500.0	500.0	78.0	ug/Kg dry	8270C	3/25/11	pas
Di-n-octyl phthalate	UL < 500.0	500.0	65.0	ug/Kg dry	8270C	3/25/11	pas
Fluoranthene	UL < 500.0	500.0	89.0	ug/Kg dry	8270C	3/25/11	pas
Fluorene	UL < 500.0	500.0	90.0	ug/Kg dry	8270C	3/25/11	pas
Hexachlorobenzene	UL < 500.0	500.0	110.0	ug/Kg dry	8270C	3/25/11	pas
Hexachlorobutadiene	UL < 500.0	500.0	130.0	ug/Kg dry	8270C	3/25/11	pas
Hexachlorocyclopentadiene	UL < 500.0	500.0	86.0	ug/Kg dry	8270C	3/25/11	pas
Hexachloroethane	UL < 500.0	500.0	130.0	ug/Kg dry	8270C	3/25/11	pas
Indeno(1,2,3-cd)pyrene	UL < 500.0	500.0	240.0	ug/Kg dry	8270C	3/25/11	pas
Isophorone	UL < 500.0	500.0	78.0	ug/Kg dry	8270C	3/25/11	pas
Naphthalene	UL < 500.0	500.0	63.0	ug/Kg dry	8270C	3/25/11	pas
Nitrobenzene	UL < 500.0	500.0	150.0	ug/Kg dry	8270C	3/25/11	pas
N-Nitroso-di-n-propylamine	UL < 500.0	500.0	140.0	ug/Kg dry	8270C	3/25/11	pas
N-Nitrosodiphenylamine	UL < 500.0	500.0	96.0	ug/Kg dry	8270C	3/25/11	pas
Pentachlorophenol	UL < 1300.0	1300.0	140.0	ug/Kg dry	8270C	3/25/11	pas
Phenanthrene	UL < 500.0	500.0	89.0	ug/Kg dry	8270C	3/25/11	pas
Phenol	UL < 500.0	500.0	130.0	ug/Kg dry	8270C	3/25/11	pas
Pyrene	UL < 500.0	500.0	92.0	ug/Kg dry	8270C	3/25/11	pas



Data Qualifiers: J - estimated value, U - Non detect, R - Poor surrogate recovery, M - Recovery/RPD poor for MS/MSD, SAMP/DUP, B - detected in blank, S - field sample as received did not meet NELAC sample acceptance criteria, L - Subcontracted Lab used, N - NELAC certified analysis

MICROSEEPS

Client Name: Weavertown Environmental Group
 Contact: Mike McCaffrey
 Address: 2 Dorrington Road
 Carnegie, PA 15106

Page: Page 9 of 15
 Lab Proj #: P1103109
 Report Date: 03/30/11
 Client Proj Name: Yeager
 Client Proj #: E10660

Sample Description	Matrix	Lab Sample #			Sampled Date/Time		Received	
S-02	Water	P1103109-03			10 Mar. 11		11 Mar. 11 12:39	
Analyte(s)	Flag	Result	PQL	MDL	Units	Method #	Analysis Date	By
WetChem								
Chloride	L	3.2	3.0	0.2	mg/L	SM4500-Cl-E	3/16/11	pas
Sulfate	UL	< 10.0	10.0	1.2	mg/L	D516-02	3/16/11	pas
Metals								
Arsenic	L	8.600	0.760	0.350	mg/Kg dry	6010B	3/28/11	pas
Barium	L	180.000	3.100	0.700	mg/Kg dry	6010B	3/28/11	pas
Cadmium	JL	0.160	0.460	0.046	mg/Kg dry	6010B	3/28/11	pas
Chromium	L	21.000	0.760	0.061	mg/Kg dry	6010B	3/28/11	pas
Lead	L	35.000	0.760	0.270	mg/Kg dry	6010B	3/28/11	pas
Mercury	JL	0.05	0.15	0.0018	mg/Kg dry	7471	3/28/11	pas
Selenium	UL	< 1.200	1.200	0.900	mg/Kg dry	6010B	3/28/11	pas
Silver	UL	< 0.920	0.920	0.460	mg/Kg dry	6010B	3/28/11	pas
Sodium	UL	< 790.000	790.000	400.000	mg/Kg dry	6010B	3/17/11	pas
Volatiles								
N 1,1,1-Trichloroethane	U	< 11.0	11.0	0.4	ug/Kg dry	8260B	3/17/11	CS
N 1,1,2,2-Tetrachloroethane	U	< 11.0	11.0	0.8	ug/Kg dry	8260B	3/17/11	CS
N 1,1,2-Trichloroethane	U	< 11.0	11.0	0.5	ug/Kg dry	8260B	3/17/11	CS
N 1,1-Dichloroethane	U	< 11.0	11.0	0.4	ug/Kg dry	8260B	3/17/11	CS
N 1,1-Dichloroethene	U	< 11.0	11.0	0.2	ug/Kg dry	8260B	3/17/11	CS
N 1,2-Dichloroethane	U	< 11.0	11.0	0.4	ug/Kg dry	8260B	3/17/11	CS
N 1,2-Dichloropropane	U	< 11.0	11.0	0.4	ug/Kg dry	8260B	3/17/11	CS
N 2-Butanone		27.0	22.0	1.6	ug/Kg dry	8260B	3/17/11	CS
N 2-Hexanone	U	< 22.0	22.0	0.4	ug/Kg dry	8260B	3/17/11	CS
N 4-Methyl-2-pentanone	U	< 22.0	22.0	1.2	ug/Kg dry	8260B	3/17/11	CS
N Acetone		120.0	22.0	5.0	ug/Kg dry	8260B	3/17/11	CS
N Benzene	J	2.0	11.0	0.3	ug/Kg dry	8260B	3/17/11	CS
N Bromodichloromethane	U	< 11.0	11.0	0.3	ug/Kg dry	8260B	3/17/11	CS
N Bromoform	U	< 11.0	11.0	0.5	ug/Kg dry	8260B	3/17/11	CS
N Bromomethane	U	< 11.0	11.0	1.5	ug/Kg dry	8260B	3/17/11	CS
N Carbon Disulfide	J	4.3	11.0	0.4	ug/Kg dry	8260B	3/17/11	CS
N Carbon tetrachloride	U	< 11.0	11.0	0.4	ug/Kg dry	8260B	3/17/11	CS
N Chlorobenzene	U	< 11.0	11.0	0.2	ug/Kg dry	8260B	3/17/11	CS
N Chloroethane	U	< 11.0	11.0	0.5	ug/Kg dry	8260B	3/17/11	CS
N Chloroform	U	< 11.0	11.0	0.4	ug/Kg dry	8260B	3/17/11	CS
N Chloromethane	U	< 11.0	11.0	0.4	ug/Kg dry	8260B	3/17/11	CS
N cis-1,2-Dichloroethene	U	< 11.0	11.0	0.4	ug/Kg dry	8260B	3/17/11	CS
N cis-1,3-Dichloropropene	U	< 11.0	11.0	0.5	ug/Kg dry	8260B	3/17/11	CS
N Dibromochloromethane	U	< 11.0	11.0	0.5	ug/Kg dry	8260B	3/17/11	CS
N Ethylbenzene	J	0.9	11.0	0.2	ug/Kg dry	8260B	3/17/11	CS
N m & p-Xylene	J	3.3	22.0	0.3	ug/Kg dry	8260B	3/17/11	CS
N Methylene Chloride	U	< 22.0	22.0	0.4	ug/Kg dry	8260B	3/17/11	CS
N o-Xylene	J	0.9	11.0	0.2	ug/Kg dry	8260B	3/17/11	CS
N Styrene	U	< 11.0	11.0	0.2	ug/Kg dry	8260B	3/17/11	CS
N Tetrachloroethene	J	1.1	11.0	0.2	ug/Kg dry	8260B	3/17/11	CS
N Toluene	J	4.7	11.0	0.2	ug/Kg dry	8260B	3/17/11	CS
N trans-1,2-Dichloroethene	U	< 11.0	11.0	0.4	ug/Kg dry	8260B	3/17/11	CS
N trans-1,3-Dichloropropene	U	< 11.0	11.0	0.4	ug/Kg dry	8260B	3/17/11	CS



Data Qualifiers: J - estimated value, U - Non detect, R - Poor surrogate recovery, M - Recovery/RPD poor for MS/MSD, SAMP/DUP, B - detected in blank, S - field sample as received did not meet NELAC sample acceptance criteria, L - Subcontracted Lab used, N - NELAC certified analysis

MICROSEEPS

Client Name: Weavertown Environmental Group
 Contact: Mike McCaffrey
 Address: 2 Dorrington Road
 Carnegie, PA 15106

Page: Page 10 of 15
 Lab Proj #: P1103109
 Report Date: 03/30/11
 Client Proj Name: Yeager
 Client Proj #: E10660

Sample Description	Matrix	Lab Sample #	Sampled Date/Time	Received				
S-02	Solid	P1103109-03	10 Mar. 11	11 Mar. 11 12:39				
Analyte(s)	Flag	Result	PQL	MDL	Units	Method #	Analysis Date	By
Volatiles								
N Trichloroethene	U	< 11.0	11.0	0.2	ug/Kg dry	8260B	3/17/11	cs
N Vinyl Chloride	U	< 11.0	11.0	0.5	ug/Kg dry	8260B	3/17/11	cs
Others								
Oil and Grease	L	930.00	160.00	40.00	mg/Kg dry	9071	3/16/11	pas
Percent Solids	L	61	0.1	0.1	%	D2974-87	3/15/11	pas
Total Petroleum Hydrocarbon	L	510.00	160.00	40.00	mg/Kg dry	9071	3/16/11	pas
SemiVolatiles								
1,2,4-Trichlorobenzene	UL	< 540.0	540.0	93.0	ug/Kg dry	8270C	3/28/11	pas
1,2-Dichlorobenzene	UL	< 540.0	540.0	110.0	ug/Kg dry	8270C	3/28/11	pas
1,3-Dichlorobenzene	UL	< 540.0	540.0	120.0	ug/Kg dry	8270C	3/28/11	pas
1,4-Dichlorobenzene	UL	< 540.0	540.0	210.0	ug/Kg dry	8270C	3/28/11	pas
2,4,5-Trichlorophenol	UL	< 1400.0	1400.0	350.0	ug/Kg dry	8270C	3/28/11	pas
2,4,6-Trichlorophenol	UL	< 540.0	540.0	140.0	ug/Kg dry	8270C	3/28/11	pas
2,4-Dichlorophenol	UL	< 540.0	540.0	160.0	ug/Kg dry	8270C	3/28/11	pas
2,4-Dimethylphenol	UL	< 540.0	540.0	130.0	ug/Kg dry	8270C	3/28/11	pas
2,4-Dinitrophenol	UL	< 1400.0	1400.0	350.0	ug/Kg dry	8270C	3/28/11	pas
2,4-Dinitrotoluene	UL	< 540.0	540.0	170.0	ug/Kg dry	8270C	3/28/11	pas
2,6-Dinitrotoluene	UL	< 540.0	540.0	190.0	ug/Kg dry	8270C	3/28/11	pas
2-Chloronaphthalene	UL	< 540.0	540.0	100.0	ug/Kg dry	8270C	3/28/11	pas
2-Chlorophenol	UL	< 540.0	540.0	180.0	ug/Kg dry	8270C	3/28/11	pas
2-Methylnaphthalene	UL	< 540.0	540.0	160.0	ug/Kg dry	8270C	3/28/11	pas
2-Methylphenol	UL	< 540.0	540.0	93.0	ug/Kg dry	8270C	3/28/11	pas
2-Nitroaniline	UL	< 1400.0	1400.0	200.0	ug/Kg dry	8270C	3/28/11	pas
2-Nitrophenol	UL	< 540.0	540.0	150.0	ug/Kg dry	8270C	3/28/11	pas
3,3-Dichlorobenzidine	UL	< 540.0	540.0	200.0	ug/Kg dry	8270C	3/28/11	pas
3-Nitroaniline	UL	< 1400.0	1400.0	170.0	ug/Kg dry	8270C	3/28/11	pas
4,6-Dinitro-2-methylphenol	UL	< 1400.0	1400.0	160.0	ug/Kg dry	8270C	3/28/11	pas
4-Bromophenyl phenyl ether	UL	< 540.0	540.0	120.0	ug/Kg dry	8270C	3/28/11	pas
4-Chloro-3-methylphenol	UL	< 540.0	540.0	260.0	ug/Kg dry	8270C	3/28/11	pas
4-Chloroaniline	UL	< 540.0	540.0	110.0	ug/Kg dry	8270C	3/28/11	pas
4-Chlorophenylphenyl ether	UL	< 540.0	540.0	130.0	ug/Kg dry	8270C	3/28/11	pas
4-Methylphenol	UL	< 1100.0	1100.0	340.0	ug/Kg dry	8270C	3/28/11	pas
4-Nitroaniline	UL	< 1400.0	1400.0	240.0	ug/Kg dry	8270C	3/28/11	pas
4-Nitrophenol	UL	< 540.0	540.0	100.0	ug/Kg dry	8270C	3/28/11	pas
Acenaphthene	UL	< 540.0	540.0	130.0	ug/Kg dry	8270C	3/28/11	pas
Acenaphthylene	UL	< 540.0	540.0	100.0	ug/Kg dry	8270C	3/28/11	pas
Anthracene	UL	< 540.0	540.0	80.0	ug/Kg dry	8270C	3/28/11	pas
Benzo(a)anthracene	UL	< 540.0	540.0	87.0	ug/Kg dry	8270C	3/28/11	pas
Benzo(a)pyrene	UL	< 540.0	540.0	80.0	ug/Kg dry	8270C	3/28/11	pas
Benzo(b)fluoranthene	UL	< 540.0	540.0	78.0	ug/Kg dry	8270C	3/28/11	pas
Benzo(g,h,i)perylene	UL	< 540.0	540.0	160.0	ug/Kg dry	8270C	3/28/11	pas
Benzo(k)fluoranthene	UL	< 540.0	540.0	170.0	ug/Kg dry	8270C	3/28/11	pas
Bis(2-chloroethoxy)methane	UL	< 540.0	540.0	120.0	ug/Kg dry	8270C	3/28/11	pas
Bis(2-chloroethyl)ether	UL	< 540.0	540.0	240.0	ug/Kg dry	8270C	3/28/11	pas
Bis(2chloroisopropyl)ether	UL	< 540.0	540.0	65.0	ug/Kg dry	8270C	3/28/11	pas
Bis(2-ethylhexyl)phthalate	UL	< 540.0	540.0	69.0	ug/Kg dry	8270C	3/28/11	pas



Data Qualifiers: J - estimated value, U - Non detect, R - Poor surrogate recovery, M - Recovery/RPD poor for MS/MSD, SAMP/DUP, B - detected in blank, S - field sample as received did not meet NELAC sample acceptance criteria, L - Subcontracted Lab used, N - NELAC certified analysis

MICROSEEPS

Client Name: Weavertown Environmental Group
 Contact: Mike McCaffrey
 Address: 2 Dorrington Road
 Carnegie, PA 15106

Page: Page 11 of 15
 Lab Proj #: P1103109
 Report Date: 03/30/11
 Client Proj Name: Yeager
 Client Proj #: E10660

Sample Description	Matrix	Lab Sample #	Sampled Date/Time	Received			
S-02	Solid	P1103109-03	10 Mar. 11	11 Mar. 11 12:39			
Analyte(s)	Flag Result	PQL	MDL	Units	Method #	Analysis Date	By
SemiVolatiles							
Butyl benzyl phthalate	UL < 540.0	540.0	56.0	ug/Kg dry	8270C	3/28/11	pas
Chrysene	UL < 540.0	540.0	180.0	ug/Kg dry	8270C	3/28/11	pas
Dibenz(a,h)anthracene	UL < 540.0	540.0	150.0	ug/Kg dry	8270C	3/28/11	pas
Dibenzofuran	UL < 540.0	540.0	130.0	ug/Kg dry	8270C	3/28/11	pas
Diethyl phthalate	UL < 540.0	540.0	87.0	ug/Kg dry	8270C	3/28/11	pas
Dimethyl phthalate	UL < 540.0	540.0	130.0	ug/Kg dry	8270C	3/28/11	pas
Di-n-butyl phthalate	UL < 540.0	540.0	85.0	ug/Kg dry	8270C	3/28/11	pas
Di-n-octyl phthalate	UL < 540.0	540.0	70.0	ug/Kg dry	8270C	3/28/11	pas
Fluoranthene	UL < 540.0	540.0	96.0	ug/Kg dry	8270C	3/28/11	pas
Fluorene	UL < 540.0	540.0	98.0	ug/Kg dry	8270C	3/28/11	pas
Hexachlorobenzene	UL < 540.0	540.0	120.0	ug/Kg dry	8270C	3/28/11	pas
Hexachlorobutadiene	UL < 540.0	540.0	140.0	ug/Kg dry	8270C	3/28/11	pas
Hexachlorocyclopentadiene	UL < 540.0	540.0	93.0	ug/Kg dry	8270C	3/28/11	pas
Hexachloroethane	UL < 540.0	540.0	140.0	ug/Kg dry	8270C	3/28/11	pas
Indeno(1,2,3-cd)pyrene	UL < 540.0	540.0	260.0	ug/Kg dry	8270C	3/28/11	pas
Isophorone	UL < 540.0	540.0	85.0	ug/Kg dry	8270C	3/28/11	pas
Naphthalene	UL < 540.0	540.0	69.0	ug/Kg dry	8270C	3/28/11	pas
Nitrobenzene	UL < 540.0	540.0	160.0	ug/Kg dry	8270C	3/28/11	pas
N-Nitroso-di-n-propylamine	UL < 540.0	540.0	150.0	ug/Kg dry	8270C	3/28/11	pas
N-Nitrosodiphenylamine	UL < 540.0	540.0	100.0	ug/Kg dry	8270C	3/28/11	pas
Pentachlorophenol	UL < 1400.0	1400.0	150.0	ug/Kg dry	8270C	3/28/11	pas
Phenanthrene	UL < 540.0	540.0	96.0	ug/Kg dry	8270C	3/28/11	pas
Phenol	UL < 540.0	540.0	140.0	ug/Kg dry	8270C	3/28/11	pas
Pyrene	UL < 540.0	540.0	100.0	ug/Kg dry	8270C	3/28/11	pas



Data Qualifiers: J - estimated value, U - Non detect, R - Poor surrogate recovery, M - Recovery/RPD poor for MS/MSD, SAMP/DUP, B - detected in blank, S - field sample as received did not meet NELAC sample acceptance criteria, L - Subcontracted Lab used, N - NELAC certified analysis

MICROSEEPS

Client Name: Weavertown Environmental Group
 Contact: Mike McCaffrey
 Address: 2 Dorrington Road
 Carnegie, PA 15106

Page: Page 12 of 15
 Lab Proj #: P1103109
 Report Date: 03/30/11
 Client Proj Name: Yeager
 Client Proj #: E10660

Sample Description	Matrix	Lab Sample #	Sampled Date/Time	Received			
S-03	Water	P1103109-04	10 Mar. 11	11 Mar. 11 12:39			
Analyte(s)	Flag Result	PQL	MDL	Units	Method #	Analysis Date	By
WetChem							
Chloride	JL 2.0	3.0	0.2	mg/L	SM4500-Cl-E	3/16/11	pas
Sulfate	UL < 10.0	10.0	1.2	mg/L	D516-02	3/16/11	pas
Metals							
Arsenic	L 8.300	0.630	0.290	mg/Kg dry	6010B	3/28/11	pas
Barium	L 130.000	2.500	0.580	mg/Kg dry	6010B	3/28/11	pas
Cadmium	JL 0.082	0.380	0.038	mg/Kg dry	6010B	3/28/11	pas
Chromium	L 19.000	0.630	0.051	mg/Kg dry	6010B	3/28/11	pas
Lead	L 27.000	0.630	0.230	mg/Kg dry	6010B	3/28/11	pas
Mercury	JL 0.05	0.14	0.0017	mg/Kg dry	7471	3/28/11	pas
Selenium	UL < 1.000	1.000	0.750	mg/Kg dry	6010B	3/28/11	pas
Silver	UL < 0.760	0.760	0.380	mg/Kg dry	6010B	3/28/11	pas
Sodium	UL < 520.000	520.000	260.000	mg/Kg dry	6010B	3/17/11	pas
Volatiles							
N 1,1,1-Trichloroethane	U < 12.0	12.0	0.4	ug/Kg dry	8260B	3/17/11	cs
N 1,1,2,2-Tetrachloroethane	U < 12.0	12.0	0.8	ug/Kg dry	8260B	3/17/11	cs
N 1,1,2-Trichloroethane	U < 12.0	12.0	0.5	ug/Kg dry	8260B	3/17/11	cs
N 1,1-Dichloroethane	U < 12.0	12.0	0.4	ug/Kg dry	8260B	3/17/11	cs
N 1,1-Dichloroethene	U < 12.0	12.0	0.2	ug/Kg dry	8260B	3/17/11	cs
N 1,2-Dichloroethane	U < 12.0	12.0	0.4	ug/Kg dry	8260B	3/17/11	cs
N 1,2-Dichloropropane	U < 12.0	12.0	0.4	ug/Kg dry	8260B	3/17/11	cs
N 2-Butanone	41.0	24.0	1.6	ug/Kg dry	8260B	3/17/11	cs
N 2-Hexanone	U < 24.0	24.0	0.4	ug/Kg dry	8260B	3/17/11	cs
N 4-Methyl-2-pentanone	U < 24.0	24.0	1.2	ug/Kg dry	8260B	3/17/11	cs
N Acetone	150.0	24.0	5.0	ug/Kg dry	8260B	3/17/11	cs
N Benzene	U < 12.0	12.0	0.3	ug/Kg dry	8260B	3/17/11	cs
N Bromodichloromethane	U < 12.0	12.0	0.3	ug/Kg dry	8260B	3/17/11	cs
N Bromoform	U < 12.0	12.0	0.5	ug/Kg dry	8260B	3/17/11	cs
N Bromomethane	U < 12.0	12.0	1.5	ug/Kg dry	8260B	3/17/11	cs
N Carbon Disulfide	J 1.0	12.0	0.4	ug/Kg dry	8260B	3/17/11	cs
N Carbon tetrachloride	U < 12.0	12.0	0.4	ug/Kg dry	8260B	3/17/11	cs
N Chlorobenzene	U < 12.0	12.0	0.2	ug/Kg dry	8260B	3/17/11	cs
N Chloroethane	U < 12.0	12.0	0.5	ug/Kg dry	8260B	3/17/11	cs
N Chloroform	U < 12.0	12.0	0.4	ug/Kg dry	8260B	3/17/11	cs
N Chloromethane	U < 12.0	12.0	0.4	ug/Kg dry	8260B	3/17/11	cs
N cis-1,2-Dichloroethene	U < 12.0	12.0	0.4	ug/Kg dry	8260B	3/17/11	cs
N cis-1,3-Dichloropropene	U < 12.0	12.0	0.5	ug/Kg dry	8260B	3/17/11	cs
N Dibromochloromethane	U < 12.0	12.0	0.5	ug/Kg dry	8260B	3/17/11	cs
N Ethylbenzene	J 0.8	12.0	0.2	ug/Kg dry	8260B	3/17/11	cs
N m & p-Xylene	J 2.9	24.0	0.3	ug/Kg dry	8260B	3/17/11	cs
N Methylene Chloride	U < 24.0	24.0	0.4	ug/Kg dry	8260B	3/17/11	cs
N o-Xylene	J 0.8	12.0	0.2	ug/Kg dry	8260B	3/17/11	cs
N Styrene	U < 12.0	12.0	0.2	ug/Kg dry	8260B	3/17/11	cs
N Tetrachloroethene	U < 12.0	12.0	0.2	ug/Kg dry	8260B	3/17/11	cs
N Toluene	J 2.6	12.0	0.2	ug/Kg dry	8260B	3/17/11	cs
N trans-1,2-Dichloroethene	U < 12.0	12.0	0.4	ug/Kg dry	8260B	3/17/11	cs
N trans-1,3-Dichloropropene	U < 12.0	12.0	0.4	ug/Kg dry	8260B	3/17/11	cs



Data Qualifiers: J - estimated value, U - Non detect, R - Poor surrogate recovery, M - Recovery/RPD poor for MS/MSD, SAMP/DUP, B - detected in blank, S - field sample as received did not meet NELAC sample acceptance criteria, L - Subcontracted Lab used, N - NELAC certified analysis

MICROSEEPS

Client Name: Weavertown Environmental Group
 Contact: Mike McCaffrey
 Address: 2 Dorrington Road
 Carnegie, PA 15106

Page: Page 13 of 15
 Lab Proj #: P1103109
 Report Date: 03/30/11
 Client Proj Name: Yeager
 Client Proj #: E10660

Sample Description	Matrix	Lab Sample #	Sampled Date/Time		Received		
S-03	Solid	P1103109-04	10 Mar. 11		11 Mar. 11 12:39		
Analyte(s)	Flag Result	PQL	MDL	Units	Method #	Analysis Date	By
Volatiles							
N Trichloroethene	U < 12.0	12.0	0.2	ug/Kg dry	8260B	3/17/11	cs
N Vinyl Chloride	U < 12.0	12.0	0.5	ug/Kg dry	8260B	3/17/11	cs
Others							
Oil and Grease	L 620.00	150.00	40.00	mg/Kg dry	9071	3/16/11	pas
Percent Solids	L 67	0.1	0.1	%	D2974-87	3/15/11	pas
Total Petroleum Hydrocarbon	L 490.00	150.00	40.00	mg/Kg dry	9071	3/16/11	pas
SemiVolatiles							
1,2,4-Trichlorobenzene	UL < 500.0	500.0	85.0	ug/Kg dry	8270C	3/25/11	pas
1,2-Dichlorobenzene	UL < 500.0	500.0	96.0	ug/Kg dry	8270C	3/25/11	pas
1,3-Dichlorobenzene	UL < 500.0	500.0	100.0	ug/Kg dry	8270C	3/25/11	pas
1,4-Dichlorobenzene	UL < 500.0	500.0	190.0	ug/Kg dry	8270C	3/25/11	pas
2,4,5-Trichlorophenol	UL < 1200.0	1200.0	320.0	ug/Kg dry	8270C	3/25/11	pas
2,4,6-Trichlorophenol	UL < 500.0	500.0	130.0	ug/Kg dry	8270C	3/25/11	pas
2,4-Dichlorophenol	UL < 500.0	500.0	140.0	ug/Kg dry	8270C	3/25/11	pas
2,4-Dimethylphenol	UL < 500.0	500.0	120.0	ug/Kg dry	8270C	3/25/11	pas
2,4-Dinitrophenol	UL < 1200.0	1200.0	320.0	ug/Kg dry	8270C	3/25/11	pas
2,4-Dinitrotoluene	UL < 500.0	500.0	150.0	ug/Kg dry	8270C	3/25/11	pas
2,6-Dinitrotoluene	UL < 500.0	500.0	170.0	ug/Kg dry	8270C	3/25/11	pas
2-Chloronaphthalene	UL < 500.0	500.0	92.0	ug/Kg dry	8270C	3/25/11	pas
2-Chlorophenol	UL < 500.0	500.0	170.0	ug/Kg dry	8270C	3/25/11	pas
2-Methylnaphthalene	UL < 500.0	500.0	140.0	ug/Kg dry	8270C	3/25/11	pas
2-Methylphenol	UL < 500.0	500.0	85.0	ug/Kg dry	8270C	3/25/11	pas
2-Nitroaniline	UL < 1200.0	1200.0	180.0	ug/Kg dry	8270C	3/25/11	pas
2-Nitrophenol	UL < 500.0	500.0	140.0	ug/Kg dry	8270C	3/25/11	pas
3,3-Dichlorobenzidine	UL < 500.0	500.0	180.0	ug/Kg dry	8270C	3/25/11	pas
3-Nitroaniline	UL < 1200.0	1200.0	150.0	ug/Kg dry	8270C	3/25/11	pas
4,6-Dinitro-2-methylphenol	UL < 1200.0	1200.0	140.0	ug/Kg dry	8270C	3/25/11	pas
4-Bromophenyl phenyl ether	UL < 500.0	500.0	100.0	ug/Kg dry	8270C	3/25/11	pas
4-Chloro-3-methylphenol	UL < 500.0	500.0	230.0	ug/Kg dry	8270C	3/25/11	pas
4-Chloroaniline	UL < 500.0	500.0	100.0	ug/Kg dry	8270C	3/25/11	pas
4-Chlorophenylphenyl ether	UL < 500.0	500.0	120.0	ug/Kg dry	8270C	3/25/11	pas
4-Methylphenol	UL < 990.0	990.0	310.0	ug/Kg dry	8270C	3/25/11	pas
4-Nitroaniline	UL < 1200.0	1200.0	220.0	ug/Kg dry	8270C	3/25/11	pas
4-Nitrophenol	UL < 500.0	500.0	92.0	ug/Kg dry	8270C	3/25/11	pas
Acenaphthene	UL < 500.0	500.0	120.0	ug/Kg dry	8270C	3/25/11	pas
Acenaphthylene	UL < 500.0	500.0	91.0	ug/Kg dry	8270C	3/25/11	pas
Anthracene	UL < 500.0	500.0	73.0	ug/Kg dry	8270C	3/25/11	pas
Benzo(a)anthracene	UL < 500.0	500.0	79.0	ug/Kg dry	8270C	3/25/11	pas
Benzo(a)pyrene	UL < 500.0	500.0	73.0	ug/Kg dry	8270C	3/25/11	pas
Benzo(b)fluoranthene	UL < 500.0	500.0	71.0	ug/Kg dry	8270C	3/25/11	pas
Benzo(g,h,i)perylene	UL < 500.0	500.0	140.0	ug/Kg dry	8270C	3/25/11	pas
Benzo(k)fluoranthene	UL < 500.0	500.0	150.0	ug/Kg dry	8270C	3/25/11	pas
Bis(2-chloroethoxy)methane	UL < 500.0	500.0	110.0	ug/Kg dry	8270C	3/25/11	pas
Bis(2-chloroethyl)ether	UL < 500.0	500.0	220.0	ug/Kg dry	8270C	3/25/11	pas
Bis(2chloroisopropyl)ether	UL < 500.0	500.0	59.0	ug/Kg dry	8270C	3/25/11	pas
Bis(2-ethylhexyl)phthalate	UL < 500.0	500.0	62.0	ug/Kg dry	8270C	3/25/11	pas



Data Qualifiers: J - estimated value, U - Non detect, R - Poor surrogate recovery, M - Recovery/RPD poor for MS/MSD, SAMP/DUP, B - detected in blank, S - field sample as received did not meet NELAC sample acceptance criteria, L - Subcontracted Lab used, N - NELAC certified analysis

MICROSEEPS

Client Name: Weavertown Environmental Group
 Contact: Mike McCaffrey
 Address: 2 Dorrington Road
 Carnegie, PA 15106

Page: Page 14 of 15
 Lab Proj #: P1103109
 Report Date: 03/30/11
 Client Proj Name: Yeager
 Client Proj #: E10660

<u>Sample Description</u>	<u>Matrix</u>	<u>Lab Sample #</u>		<u>Sampled Date/Time</u>		<u>Received</u>	
S-03	Solid	P1103109-04		10 Mar. 11		11 Mar. 11 12:39	
<u>Analyte(s)</u>	<u>Flag Result</u>	<u>PQL</u>	<u>MDL</u>	<u>Units</u>	<u>Method #</u>	<u>Analysis Date</u>	<u>By</u>
SemiVolatiles							
Butyl benzyl phthalate	UL < 500.0	500.0	50.0	ug/Kg dry	8270C	3/25/11	pas
Chrysene	UL < 500.0	500.0	170.0	ug/Kg dry	8270C	3/25/11	pas
Dibenz(a,h)anthracene	UL < 500.0	500.0	140.0	ug/Kg dry	8270C	3/25/11	pas
Dibenzofuran	UL < 500.0	500.0	120.0	ug/Kg dry	8270C	3/25/11	pas
Diethyl phthalate	UL < 500.0	500.0	79.0	ug/Kg dry	8270C	3/25/11	pas
Dimethyl phthalate	UL < 500.0	500.0	110.0	ug/Kg dry	8270C	3/25/11	pas
Di-n-butyl phthalate	UL < 500.0	500.0	77.0	ug/Kg dry	8270C	3/25/11	pas
Di-n-octyl phthalate	UL < 500.0	500.0	64.0	ug/Kg dry	8270C	3/25/11	pas
Fluoranthene	UL < 500.0	500.0	88.0	ug/Kg dry	8270C	3/25/11	pas
Fluorene	UL < 500.0	500.0	89.0	ug/Kg dry	8270C	3/25/11	pas
Hexachlorobenzene	UL < 500.0	500.0	110.0	ug/Kg dry	8270C	3/25/11	pas
Hexachlorobutadiene	UL < 500.0	500.0	120.0	ug/Kg dry	8270C	3/25/11	pas
Hexachlorocyclopentadiene	UL < 500.0	500.0	85.0	ug/Kg dry	8270C	3/25/11	pas
Hexachloroethane	UL < 500.0	500.0	130.0	ug/Kg dry	8270C	3/25/11	pas
Indeno(1,2,3-cd)pyrene	UL < 500.0	500.0	240.0	ug/Kg dry	8270C	3/25/11	pas
Isophorone	UL < 500.0	500.0	77.0	ug/Kg dry	8270C	3/25/11	pas
Naphthalene	UL < 500.0	500.0	62.0	ug/Kg dry	8270C	3/25/11	pas
Nitrobenzene	UL < 500.0	500.0	150.0	ug/Kg dry	8270C	3/25/11	pas
N-Nitroso-di-n-propylamine	UL < 500.0	500.0	140.0	ug/Kg dry	8270C	3/25/11	pas
N-Nitrosodiphenylamine	UL < 500.0	500.0	95.0	ug/Kg dry	8270C	3/25/11	pas
Pentachlorophenol	UL < 1200.0	1200.0	130.0	ug/Kg dry	8270C	3/25/11	pas
Phenanthrene	UL < 500.0	500.0	88.0	ug/Kg dry	8270C	3/25/11	pas
Phenol	UL < 500.0	500.0	130.0	ug/Kg dry	8270C	3/25/11	pas
Pyrene	UL < 500.0	500.0	91.0	ug/Kg dry	8270C	3/25/11	pas



Data Qualifiers: J - estimated value, U - Non detect, R - Poor surrogate recovery, M - Recovery/RPD poor for MS/MSD, SAMP/DUP, B - detected in blank, S - field sample as received did not meet NELAC sample acceptance criteria, L - Subcontracted Lab used, N - NELAC certified analysis

MICROSEEPS

Client Name: Weavertown Environmental Group
 Contact: Mike McCaffrey
 Address: 2 Dorrington Road
 Carnegie, PA 15106

Page: Page 15 of 15
 Lab Proj #: P1103109
 Report Date: 03/30/11
 Client Proj Name: Yeager
 Client Proj #: E10660

Sample Description	Matrix	Lab Sample #	Sampled Date/Time		Received			
WS-01	Water	P1103109-05	10 Mar. 11		11 Mar. 11 12:39			
Analyte(s)	Flag	Result	PQL	MDL	Units	Method #	Analysis Date	By
Volatiles								
N 1,1,1-Trichloroethane	U	< 5.0	5.0	0.4	ug/L	8260B	3/12/11	CS
N 1,1,2,2-Tetrachloroethane	U	< 5.0	5.0	0.3	ug/L	8260B	3/12/11	CS
N 1,1,2-Trichloroethane	U	< 5.0	5.0	0.4	ug/L	8260B	3/12/11	CS
N 1,1-Dichloroethane	U	< 5.0	5.0	0.2	ug/L	8260B	3/12/11	CS
N 1,1-Dichloroethene	U	< 5.0	5.0	0.3	ug/L	8260B	3/12/11	CS
N 1,2-Dichloroethane	U	< 5.0	5.0	0.4	ug/L	8260B	3/12/11	CS
N 1,2-Dichloropropane	U	< 5.0	5.0	0.2	ug/L	8260B	3/12/11	CS
N 2-Butanone	U	< 10.0	10.0	1.1	ug/L	8260B	3/12/11	CS
N 2-Hexanone	U	< 10.0	10.0	0.7	ug/L	8260B	3/12/11	CS
N 4-Methyl-2-pentanone	U	< 10.0	10.0	0.5	ug/L	8260B	3/12/11	CS
N Acetone	UM	< 10.0	10.0	1.4	ug/L	8260B	3/12/11	CS
N Benzene	U	< 5.0	5.0	0.1	ug/L	8260B	3/12/11	CS
N Bromodichloromethane	U	< 5.0	5.0	0.2	ug/L	8260B	3/12/11	CS
N Bromoform	U	< 5.0	5.0	0.4	ug/L	8260B	3/12/11	CS
N Bromomethane	UM	< 5.0	5.0	1.3	ug/L	8260B	3/12/11	CS
N Carbon Disulfide	U	< 5.0	5.0	0.4	ug/L	8260B	3/12/11	CS
N Carbon tetrachloride	UM	< 5.0	5.0	0.2	ug/L	8260B	3/12/11	CS
N Chlorobenzene	U	< 5.0	5.0	0.1	ug/L	8260B	3/12/11	CS
N Chloroethane	U	< 5.0	5.0	0.5	ug/L	8260B	3/12/11	CS
N Chloroform	U	< 5.0	5.0	0.2	ug/L	8260B	3/12/11	CS
N Chloromethane	U	< 5.0	5.0	0.6	ug/L	8260B	3/12/11	CS
N cis-1,2-Dichloroethene	U	< 5.0	5.0	0.2	ug/L	8260B	3/12/11	CS
N cis-1,3-Dichloropropene	U	< 5.0	5.0	0.2	ug/L	8260B	3/12/11	CS
N Dibromochloromethane	U	< 5.0	5.0	0.3	ug/L	8260B	3/12/11	CS
N Ethylbenzene	U	< 5.0	5.0	0.2	ug/L	8260B	3/12/11	CS
N m & p-Xylene	J	0.4	10.0	0.3	ug/L	8260B	3/12/11	CS
N Methylene Chloride	U	< 5.0	5.0	0.3	ug/L	8260B	3/12/11	CS
N o-Xylene	U	< 5.0	5.0	0.2	ug/L	8260B	3/12/11	CS
N Styrene	U	< 5.0	5.0	0.2	ug/L	8260B	3/12/11	CS
N Tetrachloroethene	U	< 5.0	5.0	0.4	ug/L	8260B	3/12/11	CS
N Toluene	U	< 5.0	5.0	0.2	ug/L	8260B	3/12/11	CS
N trans-1,2-Dichloroethene	U	< 5.0	5.0	0.3	ug/L	8260B	3/12/11	CS
N trans-1,3-Dichloropropene	U	< 5.0	5.0	0.3	ug/L	8260B	3/12/11	CS
N Trichloroethene	U	< 5.0	5.0	0.2	ug/L	8260B	3/12/11	CS
N Vinyl Chloride	U	< 5.0	5.0	0.5	ug/L	8260B	3/12/11	CS



Data Qualifiers: J - estimated value, U - Non detect, R - Poor surrogate recovery, M - Recovery/RPD poor for MS/MSD, SAMP/DUP, B - detected in blank, S - field sample as received did not meet NELAC sample acceptance criteria, L - Subcontracted Lab used, N - NELAC certified analysis

MICROSEEPS



FREE-COL LABORATORIES

11618 COTTON ROAD
MEADVILLE, PENNSYLVANIA 16335
PHONE: (814) 724-6242
FAX: (814) 333-1466
EMAIL: service@freecol.com

Accredited Lab ID#
Free-Col: 20-00073
Modern Erie: 25-03459

Certificate Of Analysis

Delivery Group ID: 2011:0002404

4 Sample(s) are included in this Delivery Group.

Company Name: Microseeps

Date Received 3/15/2011

Contact Name: Heather Hauser

Time Received: 11:00

Delivered By: UPS

220 William Pitt Way
Pittsburgh PA 15238

Project Name: M2781

Printed on 03/24/2011 at 08:49AM

Sample ID: 2011:0002404-1 Client's Sample ID: P1103109-01
Date Sampled: 3/10/2011 Time Sampled: 00:00 Date Received: 3/15/2011

Analyte	Result	Units	Date Analyzed	Start Time	Analyst	Method Source
---------	--------	-------	---------------	------------	---------	---------------

Organics

Ethylene glycol	<7	mg/kg	03/22/11	11:09	Williams	SW-846 8015B
-----------------	----	-------	----------	-------	----------	--------------

General Chemistry

Solids, %	77.3	%	03/19/11	14:15	Buttray	SM 2540 G
-----------	------	---	----------	-------	---------	-----------

Results expressed as mg/kg are calculated on dry weight basis.

Sample ID: 2011:0002404-2 Client's Sample ID: P1103109-02
Date Sampled: 3/10/2011 Time Sampled: 00:00 Date Received: 3/15/2011

Analyte	Result	Units	Date Analyzed	Start Time	Analyst	Method Source
---------	--------	-------	---------------	------------	---------	---------------

Organics

Ethylene glycol	<8	mg/kg	03/22/11	11:09	Williams	SW-846 8015B
-----------------	----	-------	----------	-------	----------	--------------

General Chemistry

Solids, %	65.8	%	03/19/11	14:15	Buttray	SM 2540 G
-----------	------	---	----------	-------	---------	-----------

Results expressed as mg/kg are calculated on dry weight basis.

Sample ID: 2011:0002404-3 Client's Sample ID: P1103109-03
Date Sampled: 3/10/2011 Time Sampled: 00:00 Date Received: 3/15/2011

Analyte	Result	Units	Date Analyzed	Start Time	Analyst	Method Source
---------	--------	-------	---------------	------------	---------	---------------

Organics

Ethylene glycol	<9	mg/kg	03/22/11	11:09	Williams	SW-846 8015B
-----------------	----	-------	----------	-------	----------	--------------

General Chemistry

Solids, %	61.2	%	03/19/11	14:15	Buttray	SM 2540 G
-----------	------	---	----------	-------	---------	-----------

Results expressed as mg/kg are calculated on dry weight basis.



FREE-COL LABORATORIES

11618 COTTON ROAD
MEADVILLE, PENNSYLVANIA 16335
PHONE: (814) 724-6242
FAX: (814) 333-1466
EMAIL: service@freecol.com

Accredited Lab ID#
Free-Col: 20-00073
Modern Erie: 25-03459

Certificate Of Analysis

Delivery Group ID: 2011:0002404

4 Sample(s) are included in this Delivery Group.

Company Name: Microseeps
Contact Name: Heather Hauser

Date Received: 3/15/2011
Time Received: 11:00
Delivered By: UPS

220 William Pitt Way
Pittsburgh PA 15238

Project Name: M2781

Printed on 03/24/2011 at 08:49AM

Sample ID: 2011:0002404-4 Client's Sample ID: P1103109-04
Date Sampled: 3/10/2011 Time Sampled: 00:00 Date Received: 3/15/2011

Analyte	Result	Units	Date Analyzed	Start Time	Analyst	Method Source
---------	--------	-------	---------------	------------	---------	---------------

Organics

Ethylene glycol	<9	mg/kg	03/22/11	11:09	Williams	SW-846 8015B
-----------------	----	-------	----------	-------	----------	--------------

General Chemistry

Solids, %	63.0	%	03/19/11	14:15	Buttray	SM 2540 G
-----------	------	---	----------	-------	---------	-----------

Results expressed as mg/kg are calculated on dry weight basis.

Unless otherwise noted, the results pertain only to the samples tested and meet the requirements of the 2003 NELAP Standard.

MICROSEEPS CHAIN-OF-CUSTODY RECORD

Microseeps, Inc. • 220 William Pitt Way - Pittsburgh, PA 15238

Fax: (412) 826-3433

SEND TO: Free-Col

DUE DATE: 3/18/2011

Results to: hhauser@microseeps.com
rweish@microseeps.com

Microseeps Lab Proj. # M2781

Company:	Microseeps, Inc.
Co. Address:	220 William Pitt Way, Pittsburgh, PA 15238
Phone #:	412/826-5245
Fax #:	412/826-3433

Invoice to: hhauser@microseeps.com
rwelsh@microseeps.com

[illegible]

Relinquished by: <i>John</i>	Company: <i>Microseps</i>	Date: <i>July</i>	Time: <i>1:50</i>	Received by: <i>John</i>	Company: <i>Microseps</i>	Date: <i>3/15/11</i>	Time: <i>11:00</i>
Relinquished by: <i>John</i>	Company: <i>Microseps</i>	Date: <i>3/15/11</i>	Time:	Received by:	Company:	Date:	Time:
Relinquished by: <i>John</i>	Company: <i>Microseps</i>	Date: <i>3/15/11</i>	Time:	Received by:	Company:	Date:	Time:



Microseeps
Lab. Proj. #

P1103109

CHAIN - OF - CUSTODY RECORD

Microseeps
COC cont. #

Phone: (412) 826-5245

Microseeps, Inc. - 220 William Pitt Way - Pittsburgh, PA 15238

Fax No.: (412) 826-3433

Company: W. P. Morrow Environmental
Co. Address: 2 Dorrington Rd. Carnegie, PA 15106
Phone #: 724-546-4150 Fax #: 412-429-0219
Proj. Manager: Zachary Lieb
Proj. Name/Number: Yeager E10660
Sampler's signature: [Signature]

Cooler Temp.

37/51

Parameters Requested									
Volatiles	Semi-Vols	PCRA Metals	Sodium	Ethylene Glycol	Sulfate	TPH	Chloride	Oil and Grease	Volatiles TCL (lab)
X	X	X	X	X	X	X	X	X	X

Results to: m.mccaffrey@wpmv.com
z.lieb@wpmv.com
Invoice to: WEG

Sample ID	Sample Description	Sample Type			Date	Time	Notes	Remarks									
		Water	Vapor	Solid													
B-01	Background soil			X	3-10-11		7	X	X	X	X	X	X	X	X		RUSH TAT
S-01	post-ex-soil			X	"		7	X	X	X	X	X	X	X	X		RUSH TAT
S-02	"			X	"		7	X	X	X	X	X	X	X	X		RUSH TAT
S-03	"			X	"		7	X	X	X	X	X	X	X	X		RUSH TAT
WS-01	water runoff	X			"		3									X	RUSH TAT

Relinquished by: <u>[Signature]</u>	Company: <u>WEG</u>	Date: <u>3-11-11</u>	Time: <u>1230</u>	Received by: <u>[Signature]</u>	Company: <u>WEG</u>	Date: <u>3/11/11</u>	Time: <u>1230</u>
Relinquished by:	Company:	Date:	Time:	Received by:	Company:	Date:	Time:
Relinquished by:	Company:	Date:	Time:	Received by:	Company:	Date:	Time:

WHITE COPY: Accompany Samples

YELLOW COPY: Laboratory File

PINK COPY: Submitter

**PREPAREDNESS PREVENTION AND
CONTINGENCY PLAN (PPC)
WASHINGTON COUNTY**

Range Resources Appalachia, LLC
380 Southpointe Blvd., Suite 300
Canonsburg, PA 15317

January, 2009
Revised October 2009
Revised March 2010
Revised April 2010
Revised May 2010
Revised June 2010
Revised November 2010

Table of Contents

DESCRIPTION	PAGE
1.0 EXECUTIVE SUMMARY	1
2.0 PLAN REVIEW RECORD	2
3.0 DESCRIPTION OF FACILITY	4
3.1 <i>Description of the Industrial or Commercial Activity.....</i>	<i>4</i>
3.2 <i>Description of Existing Emergency Response Plans.....</i>	<i>4</i>
3.2.1 <i>Assessments of Impacts on Downstream Water Supplies or Water Wells in Area.....</i>	<i>4</i>
3.3 <i>Materials and Waste Inventory</i>	<i>5</i>
3.3.1 <i>Liquid Storage</i>	<i>5</i>
3.3.2 <i>Dry Bulk Storage</i>	<i>5</i>
3.3.3 <i>Waste</i>	<i>5</i>
3.4 <i>Pollution Incident History.....</i>	<i>7</i>
3.5 <i>Implementation Schedule for Elements Not Currently In Place</i>	<i>7</i>
4.0 DESCRIPTION OF HOW PLAN IS IMPLEMENTED BY ORGANIZATION	8
4.1 <i>Organizational Structure of Facility for Implementation (Pollution Prevention Team)</i>	<i>8</i>
4.2 <i>List of Emergency Coordinators</i>	<i>8</i>
4.3 <i>Duties and Responsibilities of Emergency Coordinators.....</i>	<i>9</i>
4.3.1 <i>Duties after an Emergency</i>	<i>10</i>
4.4 <i>Company Officials.....</i>	<i>11</i>
5.0 SPILL OR LEAK PREVENTION AND RESPONSE.....	12
5.1 <i>Pre-Release Planning.....</i>	<i>12</i>
5.2 <i>Pollution Incident Prevention Practices</i>	<i>13</i>
5.2.1 <i>Fail Safe Engineering</i>	<i>13</i>
5.2.2 <i>Preventive Maintenance</i>	<i>13</i>
5.2.3 <i>Discharge and Drainage Control</i>	<i>14</i>
5.2.5 <i>Mitigation</i>	<i>14</i>
5.2.6 <i>Ultimate Disposition of Contaminated Materials.....</i>	<i>14</i>
5.3 <i>Material Compatibility.....</i>	<i>14</i>
5.4 <i>Inspection and Monitoring Program.....</i>	<i>15</i>
5.5 <i>Brittle Fracture Evaluations and Preventive Maintenance.....</i>	<i>16</i>
5.6 <i>Housekeeping Program.....</i>	<i>16</i>
5.7 <i>Security.....</i>	<i>17</i>
5.8 <i>External Factor Planning.....</i>	<i>17</i>
5.9 <i>Employee Training Program.....</i>	<i>17</i>
6.0 COUNTERMEASURES.....	19
6.1 <i>Countermeasures to be Undertaken by Facility.....</i>	<i>19</i>
6.2 <i>Countermeasure to be Undertaken by Contractors.....</i>	<i>22</i>
6.3 <i>Internal and External Communications and Alarm Systems.....</i>	<i>22</i>
6.4 <i>Evacuation Plan for Facility Personnel.....</i>	<i>22</i>
6.5 <i>Emergency Equipment Available for Response.....</i>	<i>23</i>

6.6	<i>Disposal</i>	23
6.7	<i>Regulatory Agency Reporting</i>	24
6.7.1	Federal Reporting	24
6.7.2	State Reporting	25
6.8	<i>Fire Suppression System</i>	26
6.9	<i>Medical and Fire Emergency Plans</i>	26
7.0	EMERGENCY SPILL CONTROL NETWORK	28
7.1	<i>Arrangements with Local Emergency Response Agencies and Hospitals</i>	28
7.2	<i>Notification Lists</i>	29
7.2.1	<i>Notification Protocol</i>	30
7.3	<i>Downstream Notification</i>	30
8.0	STORMWATER MANAGEMENT ACTIVITIES	31
9.0	EROSION AND SEDIMENTATION PREVENTION	32
10.0	ADDITIONAL REQUIREMENTS FOR EPCRA SECTION 313 FACILITIES	33
11.0	SIGNATORY REQUIREMENTS	34
12.0	PLAN REVISION AND RECORD RETENTION	35

APPENDICES

INCIDENT REPORT AND INSPECTION FORMS	APPENDIX A
INCIDENT RECORDS	APPENDIX B
IMPOUNDMENT (EXAMPLE)	APPENDIX C
PREVENTIVE SPILL PLAN	APPENDIX D
CONSTRUCTION, OPERATION, AND TESTING PROCEDURES FOR ABOVEGROUND PIPELINES	APPENDIX E
MATERIAL INVENTORY	APPENDIX F

1.0 EXECUTIVE SUMMARY

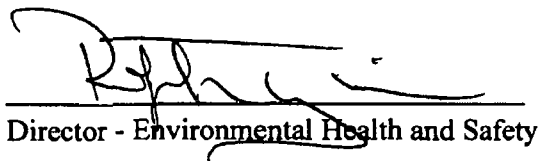
This Preparedness Prevention and Contingency (PPC) Plan is prepared for Range Resource Appalachia, LLC's (RRC) operations in Washington County, Pennsylvania. The sites are identified in the drilling permit applications, which will be located in Washington County. This PPC Plan was developed in accordance with PA DEP Guidelines #400-2200-001/September 2001, *Guidelines for the Development and Implementation of Environmental Emergency Response Plans*.

This PPC Plan is an integral part of the operation's environmental, health and safety program. It is designed to provide for foreseeable workplace occurrences and provide the response framework for those occurrences, which have the potential for employee injury or environmental damage. It contains program elements designed for prevention/control of accidental discharges of regulated substances. Further, the plan is designed to be flexible, with established guidelines, and will be reviewed on a regular basis to assure the plan is a current, viable, and useful tool.

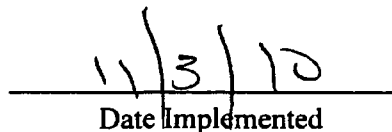
Mr. Ralph Tijerina is the administrator of this PPC Plan and is responsible for implementation and maintenance. Reviews and revisions of this plan will be completed annually unless plan failure, operational changes, or regulatory revisions necessitate otherwise. Any questions, comments, or suggestions regarding this PPC Plan should be directed to Mr. Ralph Tijerina.

Authorized for Implementation:

Ralph Tijerina



Director - Environmental Health and Safety



Date Implemented

2.0 PLAN REVIEW RECORD

The following table is a record of the periodic revisions made to this plan since the original date of plan implementation. It is required by the PADEP that the plan be reviewed annually. This plan will also be reviewed and revised if any of the following occur:

- An applicable regulation is revised;
- The plan fails in an emergency;
- There is a change in the design, construction, operation, or maintenance that materially affects the operation's potential for discharge;
- The list of emergency coordinators changes;
- The list of emergency response equipment changes; or
- As otherwise directed by an applicable agency.

Date	Revision	Signature	Comments
1-1-2009	1A		Update
10/2009	2		Added Appendix D and Appendix E and Updated Plan
03/2010	3		Updated Satellite Emergency Numbers, Added Appendix F, and Modified to Address Impoundment Inspections
4/2010	4		Updated Appendix F
6/2010	5		Update Section 5.2, Section 6.5 and Appendix F
11/2010	6		Updated Contact Information

3.0 DESCRIPTION OF SITES

3.1 Description of the Industrial or Commercial Activity

Activity to be conducted at these sites will include, but not be limited to, the construction of the access road to the well-site and the pad on which the drilling operation will be conducted, drilling of the borehole following the casing design and strategic analysis described in the Drilling Permit Application, completing and fracing of the well, flowback operations and production. The operation will be at various locations as described in the drilling permit applications for wells within Washington County. All coordinates for each borehole are stipulated in the drilling permit applications.

- The average constituents of the NGL are propane (18.28%), butane (24.59%), iso-butane (7.32%), and pentane and longer chain hydrocarbons (49.81%).
- The operation's North American Industry Classification Systems (NAICS) code is 211111 (Crude Petroleum and Natural Gas Extraction).

3.2 Description of Existing Emergency Response Plans

This plan is compatible with existing emergency response and spill prevention plans. The operations and subcontractors maintain a Spill Prevention Control and Countermeasure (SPCC) Plan compliant with 40 Code of Federal Regulations Part 112.

3.2.1 Assessments of Impacts on Downstream Water Supplies or Water Wells in Area

As part of the plan to ensure that no impacts occur to either downstream water supplies or water wells, an assessment of all water sources within a 1,000 ft radius of the well site will be conducted by identifying the location and samples will be taken to establish a baseline for the water quality prior to any activity.

The samples will be collected and tested by a state certified water-testing laboratory in order to assure an independent objective assessment. These test results will be maintained in the well file for future reference if they are required for comparison to samples taken after our activity is completed.

Best Management Practices (BMPs) will be in place to prevent the contamination of any water supply either downstream surface water supply or an identified water well. Pre-drill water sampling will be conducting in accordance with established sampling and analytical protocols.

Well Control Guideline plans include the use of equipment to contain any large amounts of water which may be required to contain or control any fires should the need exist.

During the drilling and completion process, all returned fluids will be contained in a lined reserve pit, 500 bbl frac tanks, or large lined impoundments to prevent any run-off that could cause contamination to existing water wells or surface water.

3.3 Materials and Waste Inventory

3.3.1 Liquid Storage Description

- 5 gal pails
- 55 gal drums
- 500 gal intermediate bulk containers
- 20,000 gal max diesel storage

3.3.2 Dry Bulk Storage Description

- 50 lb sack chemicals
- 55 lb sack chemicals
- 100 lb sack chemicals
- 1 ton bulk bag

The products that are used for the operations described above, but are subject to change based on the circumstances encountered during the development of the project are included in Appendix F. The MSDS for each product are required to be on site while any chemical is staged on location.

3.3.3 Waste

Waste accumulated on site will be collected and disposed of in the manner required by the Pennsylvania Department of Environmental Protection, dependent upon the classification. Waste will be minimized by the utilization of larger packaging containers. Where possible, intermediate bulk containers will be used as they can be reutilized instead of using drums thus resulting in minimal waste products.

Municipal Waste

Containerization via Waste Management, or other local, permitted waste facility/hauler.

Produced/ Frac/ Pit Water

All produced water, including drilling water, flowback water, and produced brine will be collected and either disposed according to the appropriate regulations at a permitted disposal facility or underground injection well, or will be recycled. If being disposed at a permitted disposal facility or underground injection well, one of the following companies may be used to transport the water to one of the disposal sites identified in Section 6.6:

R.T.I.
Highland Environmental Sanitation
MJ Water Co, Inc
Woods Trucking
Ted Stutzman
Devonian Industries, Inc
Burkholtz Welding
Stallion Oilfield Services
Force

If the water is being recycled, the water will be either trucked to the appropriate impoundment or pumped through aboveground piping. If the water is being transported via trucking, one of the companies detailed above may be used to transport the water to the permitted impoundment. If the water is being pumped through aboveground piping, An RRC approved water transfer contractor will be utilized to pump the water through the aboveground piping to the permitted impoundment.

3.4 Pollution Incident History

Completed records of past and future occurrences with spill reporting and response shall always be included in Appendix B.

Should a spill occur, the following information will be recorded and maintained for five years:

1. Date and time of incident;
2. Location of incident;
3. Name of individual discovering the incident;
4. Product released and amount released;
5. Causes of the spill, including failure analysis;
6. Corrective actions and/or countermeasures taken and additional preventative measures taken or contemplated.

3.5 Implementation Schedule for Elements Not Currently In Place

As of the signature dates on page 1 of this plan, all elements of this plan are currently in place.

4.0 DESCRIPTION OF HOW PLAN IS IMPLEMENTED BY ORGANIZATION

4.1 Organizational Structure of Facility for Implementation (Pollution Prevention Team)

The operational headcount on site will be no more than 30 personnel at any given time which includes both RRC and its subcontractors. The primary emergency coordinator's duties and responsibilities will be as follows:

1. Risk management and inventory of materials,
2. Establishment of all spill-reporting duties,
3. Implementation of visual inspection procedures,
4. Review of past incidents and actions taken,
5. Implementation of plan goals,
6. Coordinate all spill clean-up activities,
7. Notification of all necessary authorities,
8. Education and training of all on-site personnel,
9. Evaluation of plan and change as needed,
10. Review any changes relative to the current plan,
11. Evaluate overall effectiveness of plan, and
12. Review and update the plan on a regular basis and make changes as necessary.

Changes made to the plan which affect personnel will be communicated at the earliest available time, generally during safety meetings and put into practice as part of standard operating procedures, where necessary. Where mentoring or extended training is required for the individuals to gain experience, a mentoring system will be put in place and On-The-Job training will be documented.

4.2 List of Emergency Coordinators

The following table shows a list of the Emergency Coordinators for Range Resources Appalachia, LLC, Washington County.

All calls to report an emergency or contact one of the Emergency Coordinators should be to:

(866) 768-4756

Emergency Coordinators

Name	Title
Mr. Ralph Tijerina	Director - Health, Safety and Environmental
Mr. Craig Wyda	Sr HSE Technician
Mr. Hugh White	Security Manager – Health, Safety, and Environmental

In the event the Primary Emergency Coordinator is not present at the time of an emergency, the designated alternate individuals will accept those responsibilities.

In the rare event none of the above personnel are present; the ranking supervisor on-site will be in charge of the facility until the appropriate personnel can be contacted. All supervisory personnel who may be in charge of the facility will be trained in the proper response procedures in the event of an emergency.

Emergency phone numbers along with site lat/long coordinates will be clearly posted on-site.

4.3 Duties and Responsibilities of Emergency Coordinators

The Emergency Coordinator is responsible for the review of existing materials, storage of materials and the necessary recommendations/upgrades to update the PPC Plan, if appropriate.

If the Emergency Coordinator determines that the site has had an emission, discharge, fire, or explosion, which would threaten human health or the environment, the Emergency Coordinator must immediately notify:

- Southwest Region of the Pennsylvania Department of Environmental Protection (412-442-4000);
- Pennsylvania Department of Environmental Protection Oil & Gas Inspector;
- National Response Center (800-424-8802); and
- Pennsylvania Emergency Management Agency (717-651-2001); and report the following:
 - Name of person reporting incident,
 - Name and location of the facility,
 - Phone number where the person reporting the spill can be reached,
 - Date, time, and location of the incident,
 - A brief description of the incident, nature of the materials involved, extent of injuries, and potential effects on health or the environment,
 - Estimated quantities of the materials involved, and
 - The extent of contamination of land, water, or air, if known.

During an emergency, the Emergency Coordinator must take all reasonable measures necessary to ensure that fire, explosion, emission, or discharge do not occur, reoccur, or spread to other materials or wastes at the site. These measures shall include, where applicable, stopping operations, collecting, and containing released materials or wastes, and removing or isolating containers.

If the facility ceases operations in response to a fire, explosion, emission, or discharge, the Emergency Coordinator must ensure that adequate monitoring is conducted for leaks, pressure buildup, or ruptures in valves, pipes, or other equipment, wherever it is appropriate.

4.3.1 Duties after an Emergency

Immediately after an emergency, the Emergency Coordinator, with Pennsylvania Department of Environmental Protection (PA DEP) approval, must provide for treating, storing, or disposing of residues, contaminated soil, etc., from an emission, discharge, fire, or explosion at the site.

The Emergency Coordinator must ensure that in the affected areas of the site, no material or waste incompatible with the emitted or discharged residues is processed stored, treated, or disposed of until cleanup procedures are completed; and, all emergency equipment listed in the plan is cleaned and fit for its intended use before operations are resumed.

Within fifteen (15) days of the incident, the facility will submit a written report on the incident to the PA DEP, **unless requested sooner by the PADEP.**

4.4 Company Officials

The Emergency Coordinator will notify the following company officials, if appropriate:

Range Resources – Company Officials

Name	Title	Telephone Number
Mr. John Applegath	Vice President - Operations	(724) 678-7054
Mr. Joe Frantz	Vice President - Engineering	(412) 512-6544
Mr. Scott Roy	Vice President – Government and Regulatory Affairs	(717) 329-3441
Mr. Ray Walker	Senior Vice President – Shale Appalachia	(724) 822-0916

5.0 SPILL OR LEAK PREVENTION AND RESPONSE

5.1 Pre-Release Planning

The sources for potential spills/leaks for these sites are from aboveground storage tanks, impoundment ponds, drum and intermediate storage containers, and above ground piping which are summarized in Table 5.1.

The properties where most sites reside are situated on gentle slopes though all efforts will be to remain on level property. Where the landscape is sloped, the natural flow would be in any given location. Pre-planning addresses the potential hazards and ensures that measures will be taken to minimize any exposures which may occur. Therefore, most small spills would not travel far over the porous gravel surface.

GENERAL DESCRIPTION OF LOCATION

The location of each well site is defined in the Drilling Permit Application and depicted on the adjoining topographic map. However, each road and site pad will be constructed in a manner which minimizes the disturbance of land and will follow the Erosion and Sedimentation Control Plan, and where applicable, the ESCGP-1 permit. The areas for vehicular traffic will maintain a top layer of rock to stabilize the property.

Any centralized impoundments will be designed and constructed in a manner to maintain an interior slope of 3 horizontal to 1 vertical (3H:1V); exterior slopes of 3H:1V; a bottom slope of approximately 1% and a minimum berm width of 12 ft. These standards are the minimum standards for these types of impoundments and will follow the guidelines developed and required by the PA DEP.

5.2 Pollution Incident Prevention Practices

5.2.1 Fail Safe Engineering

There are many safeguards that are followed in all of our operations to prevent the accidental discharge of material. Many of the storage tanks are equipped with means to gauge the volume in the tank at any given time. Secondary containment according to the contractor's SPCC Plan will be required to ensure that any spills are contained. Refer to Section 5.2.3 of this PPC Plan for details of secondary containment. The BOPs will be operable during activities involved in the drilling and completion of the well to prevent blowouts should excess back pressure be experienced.

5.2.2 Preventive Maintenance

Preventative maintenance at the well site and at the impoundments involves the regular inspection and testing of the equipment and operational systems. A preventative maintenance program emphasizes the upkeep and maintenance of systems, which could, upon breakdown or failure, result in conditions that could cause environmental degradation or endangerment of public health and safety. If any deficiencies and/or leaks are discovered during the following preventative maintenance activities, the deficiencies are promptly corrected and any spilled material is immediately cleaned up. Site Inspection Checklist Forms are included in Appendix A.

- **Well Site Visual Observations** - The site is manned 24 hours a day and visual inspections will be conducted throughout.
- **Impoundment Visual Observations** - The impoundment facilities are manned 24 hours per day if there are water transfer operations ongoing at the facility, and visual inspections will be conducted throughout.
- **Well Site Detailed Inspections and Monitoring** - See Section 5.4.1, Inspection and Monitoring Program for a list of detailed inspections.
- **Impoundment Detailed Inspections and Monitoring** - See Section 5.4.2, Inspection and Monitoring Program for a list of detailed inspections.

5.2.3 Discharge and Drainage Control

- **Secondary Containment**
 - One to eleven above ground storage tanks with volumes between 210 and 400 bbls each will utilize secondary containment as defined in the SPCC Plan
 - Frac tanks will vary in volume according to the requirements of the project. Those containing any hazardous materials will be diked accordingly to minimize run off.
- **Vapor Control**
 - Provided by pressure relief valves/fittings as appropriate.
- **Dust Control** (Not applicable at this operation)

5.2.4 Mitigation

Personnel are provided with proper protective clothing and eyewear. Cleanup will be performed with brooms, shovels, and absorbent materials for small spills, and outside contractor services for large spills.

5.2.5 Ultimate Disposition of Contaminated Materials

All contaminated soils, sorbents, and waters are disposed of through properly permitted subcontractors.

5.3 Material Compatibility

Materials held in inventory are stored properly to ensure material compatibility. Incompatible materials should be recognized and individuals working at the facility should be properly informed through signage, training, etc.

An inventory of the materials stored at the facility was taken and the corresponding Material Safety Data Sheets were collected. The chemicals comprising the Engine oil, Hydraulic fluid, Methanol Inhibitor, and Antifreeze were entered into a chemical reactivity prediction program. The Chemical Reactivity Worksheet Version 1.9, developed by the CAMEO (Computer Aided Management of Emergency Operations) Team at the Hazardous Materials Research Branch of the Office of Response and Restoration at the National Oceanographic and Atmospheric Administration (NOAA) and the Chemical Emergency Prevention and Preparedness Office at the U.S. EPA was used to predict if a reactivity hazard may occur from a scenario where two materials were mixed. The computer model did not predict any unsafe reactions between the materials kept in inventory. The computer model cannot predict reactions from three or more chemicals mixing at once.

5.4 Inspection and Monitoring Program

5.4.1 Well Site Inspection and Monitoring Program

Inspections at well sites are made to check for leaks and potential hazardous areas and are documented on the checklist provided in Appendix A of this Plan. Specific inspections are performed as follows:

- Observing the exterior of ASTs, and other equipment for signs of deterioration, leaks, corrosion, and thinning.
- Checking the inventory of discharge response equipment and restocking as needed.

AST integrity inspections should be performed at intervals and specifications according to industry standards for the type of tanks present at the facility.

5.4.2 Impoundment Inspection and Monitoring Program

Inspections at impoundments are made to check for leaks and potential hazardous areas and are documented on the form provided in Appendix A of this Plan. Specific inspections are performed as follows:

- Observing the leak detection underdrain for any sign of discharge of water during the inspection or since the previous inspection.
- Checking the inventory of discharge response equipment and restocking as needed.

Inspections are conducted weekly at impoundments holding only fresh water and are conducted 2 times per week at impoundments that holding recycled water.

5.5 Brittle Fracture Evaluations and Preventive Maintenance

There are no field-constructed tanks that will be utilized on site.

Inspections will be conducted for the following, which could result in contamination of the work area or environment:

- Leaks in containment systems, tanks and piping
- Proper function of transfer pumps and isolation valves
- Condition of material handling equipment

Preventative maintenance will be performed on any areas found to be deficient as part of these inspections. This corrective action will be accomplished and documented. This documentation and the original inspection report will be retained in accordance with the requirements of this plan.

5.6 Housekeeping Program

The following items will be performed as part of facility housekeeping:

- Equipment, packaging materials, and miscellaneous materials will be inspected for leaks, oily surfaces, etc. Deficiencies shall be promptly corrected.
- Areas where materials are unloaded, transferred, or loaded will be kept free of debris.

- Cleanup, storage, disposal, and inspection procedures will be reviewed with facility personnel as part of the training requirements of this plan.
- Housekeeping conditions will be included in the facility inspections conducted in accordance with this plan.

5.7 Security

During various activities in the development of the well-site, there will be a need for security to be present at the entry point to the well site. During these periods, visitors are required to sign in and authorization will be required should they arrive unexpectedly. Only authorized personnel will be allowed on the site. When security personnel are not on site to guard the entrance, Range's person in charge on-site will be responsible for managing personnel arriving on site.

5.8 External Factor Planning

Employees are trained in procedures that are in place for emergency situations. Power outages, floods, and/or snowstorms may prevent operations from continuing, but should not result in an incident that would have an adverse effect on public health or the environment. Power outages do not increase the likelihood for release of pollutants and do not affect spill prevention measures, or spill containment, cleanup, and removal operations.

In the event of an external emergency situation, no operations involving regulated material transfer will be initiated at the site.

5.9 Training Program

Employee training shall be conducted periodically to ensure that all responsible employees are knowledgeable of emergency and spill response procedures. All employees with responsibilities under this plan shall receive annual training in the following areas, as required:

- Knowledge of the basic hazard and risk assessment techniques.
- Know how to perform basic control, containment, and/or confinement operations within the capabilities of the resources and personal protective equipment available with their unit.
- Know how to implement basic decontamination procedures.
- An understanding of the relevant standard operating procedures and termination procedures.

Employees completing the training shall be capable of demonstrating competency in the above training elements. Elements of the plan that enhance the prevention and management of environmental and safety incidents should also include and provide for training in these areas:

- Housekeeping
- Material Management Practices
- Loading and Unloading Procedures
- Site Emergency and Evacuation Procedures
- Preventative Maintenance
- Visual Inspections

This training shall be documented and included in the employee personnel files. A sufficient number of personnel shall be trained to ensure that personnel are capable of responding effectively to emergencies and to satisfactorily accomplish an evacuation of the facility if required.

6.0 COUNTERMEASURES

6.1 Countermeasures to be Undertaken

Spills of liquid material (mineral oil or aliphatic hydrocarbon) may occur from storage tanks, flow loop, equipment leaks, impoundment leaks, or spills during transfer. In the event of a spill or release, designated personnel will take the following steps:

6.1.1 Petroleum-Based Release or Hazardous Material Response Procedures: Minor Release

In the event of a minor release of oil or petroleum product to the environment, the following emergency response procedure will be conducted. A minor release is defined as a release of **less than 25 gallons** of oil product and/or less than the reportable quantity of a material to an aboveground surface, which is contained to the immediate area and does not adversely impact human health and the environment, and **does not immediately threaten groundwater or surface water**. In the event of a minor release, the following procedure will be conducted if personal safety is not at risk:

- Upon discovering a spill, the employee must immediately notify the Emergency Coordinator.
- The Emergency Coordinator will determine if the spill cleanup is within the capabilities of the Range Resources personnel to contain.
- The Emergency Coordinator may initiate the following activities, if deemed appropriate:
 - Shutdown all facility operations; and
 - Invoke evacuation of the facility.
- If the determination is made that Range Resources personnel can respond to the spill safely, then booms, spill stoppers, and absorbent materials will be deployed to contain the spill and prevent the released material from migrating.

- The Emergency Coordinator will make the necessary notifications to key Range Resources personnel, local emergency agencies, and the spill response contractor, as required.
- Call a spill response contractor listed in Section 7.1, if the on-site personnel are unable to control the release or if cleanup is necessary.
- Notify the National Response Center (1-800-424-8802) to report the release if the released material is capable of reaching navigable waters. A listing of the Emergency Response telephone numbers is provided in the Section 7.1 and 7.2.
- Assess the area to ensure that human health and environmental hazards have been mitigated.
- If the incident is associated with a release from an impoundment leak detection underdrain, dye will be added to the impoundment to determine if the discharge from the underdrain is water leaking from the impoundment. Additionally, a sample will be taken from the water in the impoundment and from the water discharging from the underdrain and the appropriate analytical will be run in the laboratory.
- Complete an incident report and update the PPC Plan and the SPCC Plan. Refer to Appendix A for a copy of the Incident Report Form.

6.1.2 Petroleum-Based Release or Hazardous Material Response Procedures: Major Release

A major release is defined as a release of **25 gallons or greater** of oil product and/or over the reportable quantity of a material to the environment or a release which **immediately threatens groundwater or surface water**. In the event of a major release where the material cannot be controlled, contained or mitigated by facility personnel, the following procedure will be implemented:

- If imminent danger exists, immediately notify everyone at the facility. Engage appropriate evacuation procedures, as necessary.
- Upon discovering a spill, the employee must immediately notify the Emergency Coordinator.

- The Emergency Coordinator will determine if the spill cleanup is within the capabilities of the Range Resources personnel to contain.
- The Emergency Coordinator may initiate the following activities, if deemed appropriate:
 - Shutdown all operations; and
 - Invoke evacuation of the site.
- If the determination is made that Range Resources personnel can respond to the spill safely, then booms, spill stoppers, and absorbent materials will be deployed to contain the spill and prevent the released material from entering the nearest down-gradient storm drain.
- The Emergency Coordinator will make the necessary notifications to key Range Resources personnel, local emergency agencies, and the spill response contractor, as required.
- Call a spill response contractor listed in Section 7.1, if the on-site personnel are unable to control the release or if additional cleaning is necessary.
- Notify the National Response Center (1-800-424-8802) to report the release if the released material is capable of reaching navigable waters. A listing of the Emergency Response telephone numbers is provided in Section 7.1 and 7.2.
- Contain the released product with all available equipment. All spent absorbent material will be placed in appropriate containers and properly transported off-site for disposal.
- Assess the area to ensure that human health and environmental hazards have been mitigated.
- If the incident is associated with a release from an impoundment leak detection underdrain, dye will be added to the impoundment to determine if the discharge from the underdrain is water leaking from the impoundment. Additionally, a sample will be taken from the water in the impoundment and from the water discharging from the underdrain and the appropriate analytical will be run in the laboratory.
- Complete an incident report and update the PPC Plan and SPCC Plan. Refer to Appendix A for a copy of the Incident Report Form. Notify the Emergency Coordinators and/or Acting Emergency Coordinators. A listing of the Emergency Response telephone numbers is as follows.

- **Spill response contractor** listed in Section 7.1, if the on-site personnel are unable to control the release or if cleanup is necessary.
- **National Response Center (1-800-424-8802)** to report the release if the released material is capable of reaching navigable waters.
- **Pennsylvania Department of Environmental Protection (PADEP) (412-442-4000)** within 30 minutes of a major release.
- **Pennsylvania State Police (911) or Satellite Number (724-229-4600)** within 30 minutes of a major release.

6.2 Countermeasure to be Undertaken by Contractors

A release that cannot be contained, controlled, and/or cleaned up by on-site personnel will require assistance from an emergency contractor listed in Section 7.1. The emergency contractor will take all necessary measures to contain, control, and/or clean up the release.

6.3 Internal and External Communications and Alarm Systems

During a spill or release, cellular telephones, 2-way radios, voice, and/or hand signals are utilized to provide immediate instruction to facility personnel. Telephones are utilized to communicate with emergency contractors and emergency response agencies in the event of a spill or release.

6.4 Evacuation Plan for Facility Personnel

In the event of a spill or release beyond a minor incident, all visitors and personnel not essential to the control and cleanup operations will evacuate the area. These individuals will exit the facility through the nearest available exit and proceed to the assembly point identified by the Emergency Coordinator (if possible, an area upwind and uphill from the incident). Employees can exit the facility by means of one (1) access road and travel in either direction along public roads to a place of safety. Signals used to begin evacuation will be voice or radio. At the

assembly point, the Emergency Coordinator or their designee will be responsible for a head count to ensure that all personnel have been accounted for.

6.5 Emergency Equipment Available for Response

Emergency equipment is maintained in proper working order, clearly labeled, and stored in strategic locations. Emergency equipment includes, portable fire extinguishers (periodically tested), spill control equipment, and first aid supplies. The spill control equipment is maintained in spill kits containing the following materials.

- 55 or 85 Gallon Drum
- Personal Protective Equipment- Nitrile gloves, Poly Tyvek, Overboots
- Oil absorbent pads, 4" oil absorbent boom, and oil absorbent granular floor dry.

If additional equipment is needed, an Emergency Response Contractor listed in Section 7.1 will be contacted to assist in containment and cleanup efforts.

After an emergency, all the equipment used will be decontaminated, cleaned, and inspected for proper working order before normal operations resume.

All equipment used for emergency procedures shall be kept in satisfactory condition and maintained and or replaced as needed. All contaminated tools or equipment shall be properly cleaned or disposed. Emergency equipment shall be tested for proper working order and be replaced as necessary.

6.6 Disposal

Waste oils, fuels, and contaminated rainwater collected at the facility as a result of a spill that cannot be recovered will be properly disposed at an appropriately permitted facility. Some liquids may also be re-used. Disposal Sites in which produced water disposed of are as follows:

Liquid Assets Disposal (LAD)

New Castle Environmental

Franklin, PA Brine Treatment Plant

Tunnelton Liquids

Eureka Resources

6.7 Regulatory Agency Reporting

An incident report form is provided in Appendix A, and will supply required information for federal, state, and local authorities as required.

6.7.1 Federal Reporting

The facility will notify the appropriate regulatory agencies and submit the current Spill, Prevention, Control, and Countermeasures (SPCC) Plan to the USEPA Region III Regional Administrator and other appropriate regulatory agencies if either of the following occurs at the subject site:

- The site discharges more than 1,000 gallons of oil into or upon the navigable waters of the United States or adjoining shorelines.
- The site discharges oil over 42 gallons in two spill events within any 12-month period.

The following information will be provided to the agencies within 60 days of a reportable spill:

- Name of the facility,
- Name(s) of the facility owner/operator,
- Location of the facility,
- Date and year of initial facility operation,
- Maximum oil storage or handling capacity and daily throughput,
- Description of facility, including maps and diagrams,
- Complete copy of the PPC and/or SPCC and amendments,
- Cause of the spill, including failure analysis, and
- Corrective actions and/or countermeasures taken.

6.7.2 State Reporting

An incident report form that will supply required information for federal, state, and local authorities is included in Appendix A.

Within fifteen (15) days of a reportable incident, the Facility will submit a written report to the PA DEP. A reportable incident includes the following:

- The facility discharges any quantity of oil or regulated substances that immediately threatens groundwater or surface water.
- The facility discharges at least 25 gallons of oil or a regulated substance onto an aboveground surface.
- A release of a hazardous substance to an aboveground surface that exceeds its reportable quantity under the Comprehensive Environmental Response, Compensation, and Liability (CERCLA) Act of 1980 and 40 CFR Part 302 (relating to designation, reportable quantities, and notification).
- A release of brine with a Total Dissolved Solids concentration less than 10,000 mg/L of 15 gallons or more.
- A release of brine with a Total Dissolved Solids concentration greater than 10,000 mg/L of 5 gallons or more.

The following information will be provided to the PA DEP within 15 days of a reportable spill:

- Name, address, and telephone number of the installation,
- Date, time, and location of the incident,
- A brief description of the circumstances causing the incident,
- Description and estimated quantity by weight or volume of materials or wastes involved,
- An assessment of any contamination of land, water, or air, which has occurred due to the incident,
- Estimated quantity and disposition of recovered materials or wastes that resulted from the incident, and
- A description of what actions the installation intends to take to prevent a similar occurrence in the future.

6.8 Fire Suppression System

Fire extinguishers are inspected periodically. These extinguishers are placed in strategic locations throughout the site. All fire extinguishers on site are compliant with American National Standards Institute (ANSI) criteria for responding to ABC class fires. These systems will be used only for small and immediately confined (first responder) fires. In all other incidents, the local Fire Department listed in Section 7.1 will be contacted to combat the fire.

6.9 Medical and Fire Emergency Plans

In the event of a medical emergency, the Emergency Coordinator must request outside emergency medical services and transportation to local hospital emergency room. Refer to Section 7.1 for emergency contact phone numbers. Contaminated individuals will be removed from the site and gross contamination will be removed by taking or cutting off their clothing.

If there is imminent danger, the Emergency Coordinator will evacuate personnel. Upon evacuation of the site, all employees, except those with emergency responsibilities, are to go to a location designated by the Emergency Coordinator which is upwind of the incident location and remain there until a head count can be taken. Under no circumstances are employees to go home until given approval to do so by the Emergency Coordinator or a designated representative.

7.0 EMERGENCY SPILL CONTROL NETWORK

7.1 Arrangements with Local Emergency Response Agencies and Hospitals

In the event of an accident, spill, or release requiring outside assistance, the following emergency response contractors, agencies, and hospitals are available to assist the facility.

Medical Agencies	
Washington Hospital	(724) 225-7000
Ohio Valley Hospital	(740) 283-7000
Canonsburg Hospital	(724) 745-6100
Washington Hospital – Burgettstown Medical Plaza	(724) 947-6261
Southwest Regional Medical Center	(724) 627-3101
St. Clair Hospital	(412) 561-4900

Emergency Contacts	
All Emergencies or use Satellite numbers only	911
Washington County Satellite Phone Number	(724) 229-4600

Emergency Response Contractors	
Spills: Weavertown Environmental Group	(800) 746-4850
Alex E. Paris	(724) 947-2235
Pipelines: Alex E. Paris	(724) 947-2235
TEAM Industrial Services Inc.	(800) 662-8326

7.2 Notification Lists

The Emergency Coordinator will notify the following company officials, as appropriate:

Range Resources – Company Officials

Name	Title	Telephone Number
Mark Hansen	Vice President - EHS	(817) 869-4217
Ray Walker	Vice President – Shale Appalachia	(724) 743-6700
John Applegath	Vice President - Operations	(724) 743-6700

The following list of government agencies and emergency organizations will be notified, as required, depending on the emergency and required response:

Emergency Management Contacts

Reporting Agency	Telephone Number
Weavertown Environmental 24-Hour Emergency Response	(800) 746-4850
Alex E. Paris 24-Hour Emergency Response	(724) 947-2235
County of Emergency Management Agency Washington County [Monday – Friday 8:30 a.m. – 4:40 p.m.] *Nights and weekends all calls are forwarded to 911	(724) 228-6911
PA DEP Regional Office	(412) 442-4000
PA Emergency Management Agency	(717) 783-8150
PA DEP Emergency Hotline	(800) 541-2050
National Response Center (Only if the spill leaves the property and is likely to enter navigable waters)	(800) 424-8802
PA Fish Commission Waterways Patrolman	(814) 445-8974

A written follow-up requirement is required within 15 days after reporting the spill. This written report should be mailed to the agencies with the exception of the National Response Center, which does not require a written follow-up. An incident report form that will supply all of the

required information for federal, state, and local authorities and mailing addresses is included in Appendix A.

7.2.1 Notification Protocol

The following narrative should be followed for making initial verbal contact with any Emergency Agency:

“This is *[state your full name]* with Range Resources – Location Coordinates. We have an emergency. Our emergency is a *[specify type of emergency.]*”

FOR PRODUCT SPILL:

It is estimated that *[state quantity]* of *[state product]* has been released.

The spill is *[contained/not contained]*.

The release occurred at *[state time – a.m./p.m.]* and lasted for approximately *[state period of time]*.

The medium or media into which the release occurred is *[state air, water, ground etc.]*.

The number of people known to be involved in the emergency is *[state number]*.

There are *[state number]* of injuries known at this time.

WAIT FOR OTHER PARTY TO HANG UP FIRST!

7.3 Downstream Notification

Not applicable at this facility.

8.0 STORMWATER MANAGEMENT ACTIVITIES

No stormwater drains are located at the sites identified in the Drilling Permit Application. Intermittent or perennial waterways within the anticipated area of influence, in the event of a release at the site, will be identified and mitigated

The procedures for site housekeeping and inspections programs, are considered to be reasonable and appropriate, and are consistent with Best Management Practices for this type of site in regards to stormwater management.

9.0 EROSION AND SEDIMENTATION PREVENTION

During construction or earth disturbance, the control of sediment migration and erosion is addressed by installing silt fences where appropriate and promptly covering disturbed land with topsoil and seed.

Where required, an Erosion and Sedimentation Control General Permit 1 will be obtained from the PADEP. An Erosion & Sedimentation Control Plan will be prepared for each site where earth disturbance activities will occur and will contain the following:

General Information

Project Description

Erosion & Sedimentation Control

Staging of Activities

Maintenance Program

Seeding, Mulching & Soil Conditioning

Hydrology

Soil Maps

Soil Information

Location Map

Exhibits

Access Road Construction	Ditch Details
Construction Entrance	Maps & Plans
Roadway Drainage	Access Road Plan
Culvert Installation	Well Site Plan
Broad Based Dips	List of Symbols
Filter Fabric Construction	
Straw Bale Filters	

10.0 ADDITIONAL REQUIREMENTS FOR EPCRA SECTION 313 FACILITIES

Not applicable. The site does not meet the criteria for EPCRA Section 313 reporting.

11.0 SIGNATORY REQUIREMENTS

The Preparedness, Prevention and Contingency Plan certification signature is included in Section 1 and signed by a signature authority as required.

12.0 PLAN REVISION AND RECORD RETENTION

The following documents related to this Preparedness, Prevention and Contingency Plan shall be kept on file for a period no less than three years:

- Inspections Records
- Corrective Action Documentation
- Training Records
- Annual Inspection Reports
- Spill Reports

This plan shall be amended whenever:

- There is a change in site construction, operation, or maintenance that may affect the discharge of significant quantities of pollutants to water, air, or land of the state.
- If a site inspection indicates the need for a plan amendment.
- If the project is found to be in violation of any of the discharge permit conditions.

A record of amendments and description of the amendments shall be signed by the Signature Authority and maintained in accordance with this section. This is included in Section 2.

APPENDIX A



INCIDENT REPORT

Environmental & Safety
V2007-1

GENERAL INFORMATION							
LOCATION:				DISTRICT:			
DEPARTMENT:				FIELD:			
REPORTED BY:				PHONE #:			
NOTIFIED BY:				PHONE #:			
WITNESSES:				PHONE #:			
DATE OF INCIDENT:		TIME:		DATE REPORTED:			
PHOTOS TAKEN?		YES <input type="checkbox"/> NO <input type="checkbox"/>		IF YES, SENT TO:			
INCIDENT:		RANGE <input type="checkbox"/> CONTRACTOR <input type="checkbox"/>		CONTRACTOR/OTHER:			
IDENTIFY INCIDENT							
INJURY:		PROPERTY DAMAGE:		ENVIRONMENTAL:			
Injured Party: _____ Injury Type: _____ ____ Lost Days (if applicable) ____ Date Returned to Work (if applicable)		_____ <input type="checkbox"/> Other: _____		<input type="checkbox"/> Spill Volume _____ <input type="checkbox"/> Spill Recovered _____ bbls <input type="checkbox"/> Water <input type="checkbox"/> Hydrocarbon <input type="checkbox"/> Emulsion <input type="checkbox"/> Gas <input type="checkbox"/> Gas Leak Volume _____ <input type="checkbox"/> Public Impact / Complaint <input type="checkbox"/> Emission Limit Type _____ <input type="checkbox"/> Regulatory Action			
OSHA		Env Reportable?		PROCESS LOSS:			
_____		Yes <input type="checkbox"/> No <input type="checkbox"/>		_____ Other (Specify) _____ Total Estimated Cost: _____ AFE # (if applicable): _____			
				TERRAIN AFFECTED: _____			
PERSONNEL/GOVERNMENT AGENCIES NOTIFIED (IF MORE SPACE REQUIRED, PLEASE LIST ON SEPARATE SHEET)							
DATE NOTIFIED:		AGENCY CONTACT PERSON:		CONTACT PHONE #:		AGENCY/RANGE DEPARTMENT:	
Clearly describe how the incident occurred (ex: who, what, when, where, why and how. Address all items checked above. Include recent trends based on risk assessments and observations. Update this section as information becomes available.							
Date		Description					
IMMEDIATE CAUSES							
<input type="checkbox"/> Following Procedures		<input type="checkbox"/> Following Procedures		<input type="checkbox"/> Following Procedures			
<input type="checkbox"/> Use of Protective Methods		<input type="checkbox"/> Use of Protective Methods		<input type="checkbox"/> Use of Protective Methods			
<input type="checkbox"/> Inattention/ Lack of Awareness		<input type="checkbox"/> Inattention/ Lack of Awareness		<input type="checkbox"/> Inattention/ Lack of Awareness			
REMEDIAL ACTIONS SECTION							
REMEDIAL ACTIONS (to reduce or eliminate the direct and indirect causes)							
Description		Target Date		Completed Date		Action By	

Please E-Mail Completed Form to mhansen@rangeresources.com or fax to (817) 889-9188 attn: EHS Dept.

Annual Facility Inspection Checklist

This inspection record must be completed each year. If any response requires further elaboration, provide comments in Description & Comments space provided. Further description and comments, if necessary, must be provided on a separate sheet of paper and attached to this sheet. *Any item that receives "yes" as an answer must be described and addressed immediately.

WELL NAME: _____

	Y*	N	N/A	Description & Comments
Storage tanks				
Tank surfaces show signs of leakage				
Tank is damaged, rusted or deteriorated				
Bolts, rivets or seams are damaged				
Tank supports are deteriorated or buckled				
Tank foundations have eroded or settled				
Level gauges or alarms are inoperative				
Vents are obstructed				
Oil is present in the interstice				
Containments				
Surfaces show signs of Leakage				
Containment is damaged or deteriorated				
Piping				
Valve seals or gaskets are leaking				
Pipelines or supports are damaged or deteriorated				
Joints, valves and other appurtenances are leaking				
Buried piping is exposed				
Out-of-service pipes are not capped				
Warning signs are missing or damaged				
Loading/unloading and transfer equipment				
Concrete in area is deteriorated				
Connections are not capped or blank-flanged				
Drip pans have accumulated oil or are leaking				
Security				
Lighting is non-functional				
Pumps and valves are not locked (and not in use)				
Response equipment				
Response equipment inventory is incomplete				

Annual reminders:

- < Hold SPCC Briefing for all oil-handling personnel (and update briefing log in the Plan);
- < Check contact information for key employees and response/cleanup contractors and update them in the Plan as needed

Additional Remarks:

Date: _____

Signature: _____

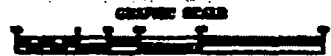
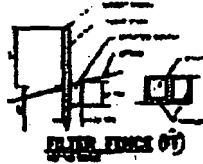
Input Fields	Description
General Information	
Impoundment Name	
Date	
Time	
Inspector	
Impoundment Contents	
Water Type	Fresh, Blended or Other
Current Volume (bbls)	
pH	
Specific Conductance (umhos)	
TDS (ppm)	
Boom Installed	Yes or No
Are there Noticeable Odors?	None, Hydrocarbons, Algae, Other
Is Skimming Required?	Yes or No
Leak Detection	
Flow in the under drain?	Yes or No
Rate of Flow (gpm)	
Estimated Volume of Fluid Leaked	
pH	
Specific Conductance (umhos)	
TDS (ppm)	
Is flow contained on location or in sediment trap?	Yes or No
Has flow entered nearby stream or tributary?	Yes or No
Upstream Water Quality Measurements	
pH	
Specific Conductance (umhos)	
TDS (ppm)	
Downstream Water Quality Measurements	
pH	
Specific Conductance (umhos)	
TDS (ppm)	
Estimated Length of Stream Contamination (ft)	
Observed Impacts to Aquatic Life	
Structural Inspection	
Are the impoundment slopes vegetated?	Yes or No
Are there areas of observable slumping or erosion on the slopes?	Yes or No
Are the proper Erosion & Sedimentation BMPs in place and functioning?	Yes or No
Are there observable holes in the liner?	Yes or No
Is the liner floating?	Yes or No
Is there high tensile fencing installed?	Yes or No
Access Road Condition	Excellent, Fair or Poor

APPENDIX B

APPENDIX C



NO. 178



Copyright © 2000 by the State of Tennessee, Department of Transportation, Division of Highways, 11.07.00

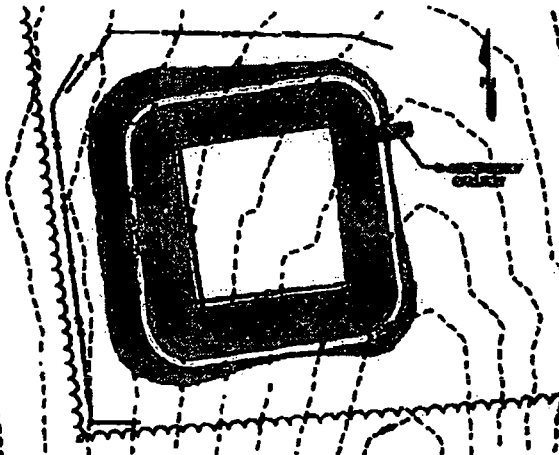
NOTES

PROPOSED FRACKING POND

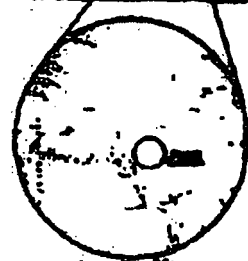
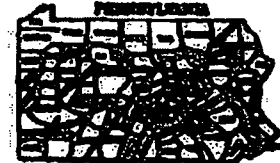
BOTTOM ELEVATION 1777.0
BERM ELEVATION 1782.0

DESIGN INFO:
INSIDE SLOPED 3:1
OUTSIDE SLOPED 2:1
POND BOTTOM SLOPED 1:1
BERM WIDTH 12'

Pond Volume:
6,577,226.57 gallons (US)
63,294.04 barrels (petroleum)



1" = 100'
1" = 10' H



Location Map
Scale 1" = 100 miles

NOTES:
1. The proposed pond is located within the boundary of the proposed well pad.
2. The proposed pond is located within the boundary of the proposed well pad.
3. The proposed pond is located within the boundary of the proposed well pad.

DESIGNER'S NOTE:
The proposed pond is located within the boundary of the proposed well pad.

DESIGNER'S NOTE:
The proposed pond is located within the boundary of the proposed well pad.

DESIGNER'S NOTE:
The proposed pond is located within the boundary of the proposed well pad.

DESIGNER'S NOTE:
The proposed pond is located within the boundary of the proposed well pad.

DESIGNER'S NOTE:
The proposed pond is located within the boundary of the proposed well pad.

DESIGNER'S NOTE:
The proposed pond is located within the boundary of the proposed well pad.

DESIGNER'S NOTE:
The proposed pond is located within the boundary of the proposed well pad.

DESIGNER'S NOTE:
The proposed pond is located within the boundary of the proposed well pad.

DESIGNER'S NOTE:
The proposed pond is located within the boundary of the proposed well pad.

DESIGNER'S NOTE:
The proposed pond is located within the boundary of the proposed well pad.

DESIGNER'S NOTE:
The proposed pond is located within the boundary of the proposed well pad.

DESIGNER'S NOTE:
The proposed pond is located within the boundary of the proposed well pad.

DESIGNER'S NOTE:
The proposed pond is located within the boundary of the proposed well pad.

DESIGNER'S NOTE:
The proposed pond is located within the boundary of the proposed well pad.

DESIGNER'S NOTE:
The proposed pond is located within the boundary of the proposed well pad.

DESIGNER'S NOTE:
The proposed pond is located within the boundary of the proposed well pad.

DESIGNER'S NOTE:
The proposed pond is located within the boundary of the proposed well pad.

DESIGNER'S NOTE:
The proposed pond is located within the boundary of the proposed well pad.

DESIGNER'S NOTE:
The proposed pond is located within the boundary of the proposed well pad.

DESIGNER'S NOTE:
The proposed pond is located within the boundary of the proposed well pad.

APPENDIX D

Preventive Spill Plan

The purpose of this portion of the PREPAREDNESS PREVENTION AND CONTINGENCY PLAN (PPC) is ensure that adequate engineering controls are designed and utilized to minimize the potential of a spill being created due to a failure. This protocol allows for the standard practice of defining a quality control process or process safety management which assesses the process flow as a means to maintain continuous improvement during the transferring of liquids. The Management of Change procedure will be implemented to ensure that like parts are utilized and an approval of the change has been authorized by a competent Range Resources representative. In order to achieve this, the processes will be separated into various sections that have the potential to have a spill. For each section, the process control, engineering review of equipment and means to ensure that all contractors and Range Resources' personnel are aware of the processes involved and are trained accordingly.

The quality process will highlight the following areas:

TRAINING

Contractor: Range Resources will provide documented training on the PPC Plan to ensure that all contractors are aware of its function and issue them a traceable copy (controlled document). Each copy of the PPC Plan will be assigned a number referencing that contractor's name. A log of the issuance will be maintained by the Range Safety Department in Canonsburg, PA. The contractor will be instructed that it is necessary for their copy to be present with their employees when they are conducting business for Range or when they are present on any Range site. Copies of the issued PPC Plan can be reproduced and distributed to their employees as necessary.

It is the responsibility of the contractor to provide training to their employees that will be in a position that requires them to act in the event of a release (leak or spill). These employees will need to understand the function of the PPC Plan along with the reporting structure that must be followed. Range has the right to require that these employees understand and follow the protocol

established to ensure that failures do not occur. Failure to follow these work requirements could jeopardize the contractor's ability to conduct business with Range in the future.

Contractor Employees: In an effort to eliminate the potential for releases, it is the responsibility of the contractor to provide adequate training to its employees so that they have a level of competency to perform their tasks proficiently. Each employee should understand and recognize hazards within their areas of operation that could pose harm to personnel or the environment. Employees should recognize that specified equipment is being installed and should ensure that any substitutions of equipment or materials follow an approved Management of Change process.

Any new employees hired by the contractor must be trained on the PPC Plan process. The contractor will be subject to audit by Range at any time to ensure that complete records are being maintained. It is the responsibility of the contractor to ensure that this procedure is being followed.

LIQUID TRANSFER

The transfer of fluids results in the largest risk with respect to the potential for spills which may impact the environment. Water is transferred through above ground piping in several different scenarios including, but not limited to:

- Centralized Water Impoundment to Centralized Water Impoundment
- Centralized Water Impoundment to Well Pad Storage Tanks
- Well Pad Storage Tanks to Blender
- Wellhead to Flowback Tanks
- Flowback Tanks to Centralized Water Impoundment
- Flowback Tanks to Production Storage Tanks

Range Resources has developed Construction, Operation, and Testing Standards which will be provided to all contractors installing or operating aboveground pipeline in any of these instances.

The contractor will be provided training on the standards described in the plan and will be provided a copy of the standards. It will be the responsibility of the contractor to train all personnel that will be working on the pipeline on the standards and document that the personnel have been trained. Any contractor not following the standards detailed in this plan will jeopardize their right to do future work with Range Resources.

PROCESS CONTROL

Process control is a means of identifying the type of work being performed, materials to be required and a plan to install or rig up such equipment. The process will require that the flow material be engineered to meet the specifications set forth by Range for the task at hand.

Range expects that contractors will be able to professionally engineer a process that identifies materials required and that will perform the needs taking into account terrain, location size, restrictions and weather conditions as well to eliminate failure. Any additional fail-safe measures should always be recommended as new technologies are developed to minimize risk.

MANAGEMENT OF CHANGE

In formalizing a substitution process for equipment or materials, Range will utilize a process taken from Process Safety Management (29 CFR 1910.199). The use of Management of Change within this sector requires the need to ensure that the components being replaced have been selected based on their ability not to compromise the specifications of the original equipment or materials. Therefore, accurate specifications of the original equipment must be maintained in order to maintain integrity. Once a replacement product has been selected, the Management of Change must be approved by a Range representative. In some cases, supportive documentation may be requested.

Management of Change not only addresses maintenance but it also addresses what should be done should a change in the process itself be required. An approval of the change would still be documented and required by a Range representative. All personnel involved in the process will

need to be trained in the understanding of the change and what modifications will need to be made.

ENGINEERING STUDY OF EQUIPMENT

The type of equipment being used to conduct the process will need to be selected based on the performance required. The specifications will be the responsibility of the contractor. The contractor will mark all transfer equipment with the pressure ratings, classification and owner's name on each section. The transfer equipment described are the sections of transfer piping, fittings or fluid transfer hoses. All gasket materials used to make connections must be inspected prior to each use in order to assure integrity. Any gaskets not deemed to be suitable will be replaced immediately. Spares should be maintained at all times so as not to compromise the transfer equipment.

Any connections that require mechanical means to secure them should ensure that the instruments are functional. Any plumbing that can become loose due to vibration must use locking mechanisms. The type of the mechanisms utilized should be engineered to maintain their integrity throughout the project.

WORK PRACTICES

The tasks being conducted by all personnel in the operation are responsible to ensure that breaches are immediately addressed once discovered. During the Job Safety Analysis or Hazard Assessment Analysis, potential non-conformities will be identified and a means to monitor will be discussed. Personnel assigned to other duties may be asked to maintain vigilance on any equipment in their view of site or designated area. All personnel conducting tasks on the worksite must be competent in the performance of their duties. Certain job tasks require certification. Any employee conducting these functions must have current valid certifications for specified equipment type being operated where applicable.

Any SSEs (Short Service Employees) that are working in the area will be assigned a mentor who will conduct on-the-job training. The mentor must ensure that the SSE comprehends the task being assigned and can carry it out proficiently. The SSE should not be allowed to operate any equipment unless they have been authorized to by the mentor or a qualified person.

STOP WORK authority is a practice that allows any employee with any company on the work site to stop the work being performed should there be imminent danger associated with any task being performed. This practice gives authority to all individuals to monitor the worksite and make decisions that can prevent the damage to the environment, equipment or injury to any employee. The incentive for this practice is to encourage personnel to look for situations that can cause a disruption to the operation without retribution.

REPORTING STRUCTURE

A general reporting structure has been developed for all Range sites. No names are provided in the flowchart, due to the fact that the names may change based on the project or job task being performed. This flowchart will be reviewed on each site with all personnel performing tasks during the job and names will be assigned and phone numbers will be provided for each general job title provided on the flowchart. The flowchart will be provided to each person working on the job for their use if an incident occurs that requires reporting.

NON-COMFORMANCE

Non-conformities define the failure in either a process or a failure of equipment or materials. In order to minimize the probability of a failure, competencies must be met. All non-conformities must be reported immediately and the corrective measures implemented. Once the control of the failure has been completed, the investigative process shall be initiated.

Bearing in mind that the term non-conformity can apply to operational issues as well as equipment functionality poses the need to ensure that personnel perform accordingly. In order to minimize equipment failure, it is imperative that personnel provide adequate maintenance and

inspections. Failure to provide these services will be considered a non-conformity and corrective measures must be implemented immediately to ensure that these vital needs are met.

CORRECTIVE MEASURES

For a release, a corrective measure implies that all resources will be deployed to restrict the potential for damage to the environment. Barriers such as booms and absorbent materials are available for use in areas that can assist in restricting the flow of the released material. Vacuum trucks will be utilized where possible and remedial measure will be put in place to minimize impact.

DISPOSAL

The disposal of any liquid residual waste or produced water will be in accordance with Pennsylvania regulations and at those sites mentioned in Section 6.6 under Countermeasures of this document. These facilities have already been identified and authorized by Range Resources Regulatory Department and should not be deviated from.

Solid waste will be analyzed to determine if any hazards exist and will be disposed of according to state regulations. Identified Emergency Management contactors will be responsible for following regulations to ensure that Range complies accordingly. Any discrepancies or clarifications must receive approval from Range's Regulatory Department prior to movement of the solid waste.

APPENDIX E

**CONSTRUCTION, OPERATION, AND
TESTING PROCEDURES FOR
ABOVEGROUND PIPELINES**

RANGE RESOURCES – APPALACHIA, LLC

**Prepared by:
Range Resources – Appalachia, LLC
380 Southpointe Blvd., Suite 380
Canonsburg, Pennsylvania 15317**

OCTOBER 2009

CONSTRUCTION, OPERATION, AND TESTING PROCEDURES FOR ABOVEGROUND PIPELINES

RANGE RESOURCES – APPALACHIA, LLC

1.0 INTRODUCTION

These Construction, Operation, and Testing Procedures are intended to be used by all Range Resources operations personnel and contractors for aboveground piping being installed for the purposes of conveying water that is not fresh water.

1.1 Pipe

All pipe shall be manufactured to the dimensions and tolerances specified in the manufacturer's specifications for the specified piping. The pipe shall be inspected by the manufacturer per industry accepted manufacturer standards for the following:

- Diameter;
- Wall thickness;
- Concentricity;
- Quick burst pressure and ductility; and
- Overall workmanship inspection on inside diameter (ID) and outside diameter (OD).

The pipe shall be homogeneous throughout and free of visible cracks, holes, voids, foreign inclusions, or other deleterious defects. The pipe shall also be identical in color, density, and other physical properties throughout. The pipe manufacturer must certify that the pipe meets the ASTM specifications appropriate for the type of pipe being installed and provide that certification to the contractor.

1.2 Fittings

All fittings for piping shall be standard commercial products manufactured as specified for the pipe to be utilized. The fittings shall be supplied by the same manufacturer as the pipe. The manufacture of the fittings shall be in accordance with good commercial practice to provide fittings homogeneous throughout and free from cracks, holes, foreign inclusions, voids, or other injurious defects. The fitting shall be as uniform as commercially practicable in color, opacity, density, and other physical properties. The minimum "quick-burst" strength of the fittings shall not be less than that of the pipe with which the fittings is to be used.

2.0 DELIVERY

2.1 Labeling

The Pipe Manufacturer shall identify the segments of pipe with the following:

- Nominal size;
- Pressure rating;
- Type or trade name of pipe; and
- Material Classification.

A Range Resources representative or a contractor's representative under the direction of a Range Resources representative shall examine the pipe upon delivery to the project site and any deviation from the above requirements shall be reported to the manufacturer. Any pipe that deviates from the specification shall not be used in the water transfer operation.

2.2 Transportation and Handling

The pipe shall be transported in a manner designed to deliver the pipe to the project neatly, intact, and without physical damage. The pipe shall be properly supported, stacked, and restrained during transport such that the pipe is not nicked, gouged, or physically damaged. A Range Resources representative shall conduct an inspection of the pipe for defects and damage upon delivery to the site.

2.3 Storage

Pipe shall be stored on clean, level ground to prevent undue scratching or gouging of the pipe. If the pipe must be stacked for storage, such stacking shall be done in accordance with the pipe manufacturer's recommendations when on a Range site. The handling of the pipe shall be done in such a manner that it is not damaged by dragging over sharp objects or cut by chokers or lifting equipment.

Sections of pipe with cut or gouges greater than 10 percent of the wall thickness of the pipe shall be cut out and removed. The undamaged portions of the pipe shall be rejoined by the manufacturer's recommended method.

3.0 INSTALLATION

3.1 Installation Process Preparation

The pipeline route shall be determined in advance by Range Resources operations personnel and the contractor performing the pipeline installation. When determining the pipeline route, care should be taken to avoid crossing streams to the greatest extent possible, especially High Quality and Exceptional Value streams. In addition, where it is necessary to utilize an existing culvert under a road for the purposes of crossing the

road with the pipeline, permission shall be obtained from either the township or the state, depending on the designation of the road.

3.2 Installation Procedures

When installing the pipeline, Range Resources personnel shall ensure that the contractor does not install 90° elbows, especially at critical points, such as at low points in the pipeline. In locations where a 90° elbow might be utilized, a sweep (long radius 90° elbow) shall be utilized in lieu of the 90° elbow to help to avoid excess restrictions thus resulting in higher pressures and blow-outs of the pipeline at these types of locations.

The contractor installing the pipeline shall install check valves at a minimum at all low points in the pipeline. The purpose of the check valves is to help to eliminate a discharge of water if the pipeline is compromised. Additionally, the contractor shall install check valves on straight runs of pipeline if there has been no check valve installed due to elevation change for 300 yards. This will allow for isolation of portions of the pipeline if the pipeline is compromised or for the purposes of emptying the line. Check valves shall also be installed on either side of a road crossing, where the pipeline is installed through an existing culvert under the road that serves to convey stormwater under the roadway.

At all locations where elbows and sweeps are used in the pipeline, an energy dissipater shall be utilized to help absorb any "water hammer" effect that may occur at those critical points due to turning pumps on and off. Alternatively, the pipeline installation contractor shall provide for flexibility at the joints of the piping. The energy dissipater may be placing soil over the pipeline at the location of the elbow or sweep, placing hay bales or temporary "thrust blocks" at the location of the elbow or sweep. Additionally, elbows and sweeps suspended in the air shall be braced through the use of hay bales or some sort of temporary "block" to absorb the energy.

3.3 Road Crossings

All road crossings shall be evaluated by Range Resources operations personnel during the planning process. Installation of pipeline through an existing culvert shall be avoided if at all possible by installing a new culvert in the road or by crossing the road above the road surface by using bridges and flag men. If there is no alternative but to install the piping through an existing culvert, Range Resources personnel shall obtain approval from either the township or the state, dependent upon the classification of the road. If the piping is installed through an existing culvert that is used for stormwater conveyance under the road, the piping shall only be in place as for the time period necessary for the water conveyance. While the piping is in place through the culvert, Range Resources operations personnel shall periodically monitor the flow through the culvert and remove the pipeline if the roadway is about to be breached by stormwater flow that cannot adequately pass under the roadway through the culvert.

4.0 JOINING

Sections of pipe should be joined into continuous lengths on the job site. The joining method shall be a method appropriate for the type of pipe being utilized and shall be performed in strict accordance with the pipe manufacturer's recommendations. No piping or fittings shall be joined by gluing. The equipment used in the joining procedures should be capable of meeting all conditions recommended by the pipe manufacturer. Only like fittings shall be used.

All pipes, fittings, and joints shall be inspected by the contractor or Range operations personnel installing the pipe. The contractor or Range operations personnel shall ensure that pipes and fittings are not broken, cracked, or otherwise contain damaged or unsatisfactory material. Prior to joining, the contractor or Range operations personnel

shall ensure that the surface area is clean and free of moisture, dust, dirt, debris of any kind, and foreign material.

The contractor and Range operations personnel shall inspect all joints following joining. Joined segments of pipe shall be handled so as to avoid damage to the pipe. When lifting or moving joined sections of pipe, chains or cable type chokers must be avoided. Nylon slings are preferred. Spreader bars are recommended when lifting or moving long joined sections. Care must be exercised to avoid cutting or gouging the pipe.

5.0 NON-DESTRUCTIVE TESTING

All pipe joints must be non-destructively tested by hydrostatic pressure testing. Other non-destructive tests may be used if all of the following conditions are satisfied:

- The contractor installing the pipe can document its effectiveness;
- The method is approved by the pipe manufacturer; and
- The method is approved by Range Resources personnel.

The Range Resources Environmental Engineering Manager or Regulatory Manager shall verify the effectiveness and validity of the proposed test method.

The hydrostatic pressure test shall be performed using fresh water and in accordance with the pipe manufacturer's recommendations and current industry standards. The contractor or Range Resources operations personnel shall follow all safety requirements. The general procedures for the hydrostatic pressure test are as follows:

- The pipe shall be in place and all connections made prior to testing.
- The entire length of pipeline shall be tested as one test, unless approved to be tested in shorter segments by Range Resources personnel.

- Hydrostatically test the pipe to the manufacturer's rated pressure for the pipe, within the limitations of the topography.
- The line being tested is acceptable if there is no more than a 5% pressure drop over 30 minutes. Every joint and mechanical connection shall be inspected while under pressure, and any joint that shows any leakage shall be repaired and then the pipeline retested.

The contractor shall record the beginning and ending pressure and beginning and ending time of each test. As an additional means of recording the pressure test, the contractor performing the test may choose to line chart the pressure test. This record shall be supplied to Range Resources personnel by the contractor for Range's files. The contractor shall also record any leaks that were found and repaired during the test and the information for the retest after repair.

6.0 PIPELINE MONITORING DURING OPERATION AND REMEDIAL MEASURES

6.1 Pipeline Monitoring

The contractor shall monitor the pipeline at all times during pumping operations. The contractor shall provide sufficient personnel to monitor all points along the pipeline at least one time per hour. All monitoring activities shall be recorded and provided to Range Resources operations personnel on a daily basis. The contractor shall record the following information:

- Name of person performing the monitoring;
- Portion of pipeline being monitored (for example, monitoring pipeline for booster pump 1 to stream crossing at xyz road);
- Time that person begins walking the segment of pipeline and completes walking the segment of pipeline;

- If no leaks were encountered during the monitoring period, record that no leaks were encountered; and
- If a leak was encountered, the location of the leak and the immediate response that was performed to remedy the situation.

Additionally, all pumps, including booster pumps, shall be manned by contractor personnel at all times during operation. Alternatively, the contractor may equip the pumps with automatic shut-off switches that will sense a significant pressure drop and automatically shut off the pump.

Finally, the contractor may choose to line chart the pressure on the pipeline during operation to maintain a record. This record shall be supplied to Range Resources personnel by the contractor for Range's files.

6.2 Remedial Measures on Standby

At all times during the pumping operations, the following remedial measures shall be kept on standby at the locations detailed for the length of the pipeline:

- Fresh water shall be kept either in tanker trucks or in frac tanks at the well site where operations are being conducted. Alternatively, the contractor or Range Resources operations personnel may choose to locate the fresh water near the location of stream crossings or other environmentally critical areas of the pipeline.
- Absorbent materials shall be kept near environmentally critical areas, such as areas where the pipeline crosses streams or at low points in the pipeline.
- A vacuum truck shall be kept on standby at all times during the pumping operations.

In the event of a spill from the pipeline, the contractor and Range Resources personnel shall immediately implement the PPC Plan.

APPENDIX F

MATERIAL LIST

The following products may be used for the operations described above, but are subject to change based on the circumstances encountered during the development of the project. The MSDS for each product are required to be on site while any chemical is staged on location.

#190 Penetro 90 Spray	ANCO BAR
#199 Silver Streak Wire Rope Lube	ANCO BX
#199 Silver Streak Wire Rope Lube Spray	ANCO CAT
#274 Moly EP Synthetic Plus Grease #1	ANCO DD
#700 Supreme 7000 SAE 15W-40	ANCO Defoam
40 HTL	ANCO Drill (A, N)
6040 Blend	ANCO Fiber
ABS MUL	ANCO FSG 2000
ABS-4 MUD	ANCO GEL
ABS-40	ANCO LIG
Acetic Acid 60%	ANCO Liquid Phalt S
Acid Pensurf	ANCO Micro blend
Acroclear	ANCO MUL MOD
AI-2	Anco Mul OW
AI-250	Anco Mul P
Airfoam 311	ANCO Mul S
ALCOMER 74-1/Anco Thin HT-L	Anco Mul T
ALCOMER 90L	Anco Mul T Plus
Aldacide G Antimicrobial	Anco Mul Thin
ALL CMS	Anco Pac
ALL Defoam	Anco PH PA
ALL PAC	Anco Phalt Plus
ALL PAC UL	Anco Phalt S
ALL Shale HIB	Anco Pipe Free
ALL Slide DB	Anco Poly Beads
ALL STC	Anco Rig Wash
ALL Surfak PG	Anco Rope
ALL Tex	Anco Salt Gel
ALL Walnut Beads	Anco Shale Treat
Alpha 125	Anco Sorb (Alcosorb)
Alpine Drill Beads	Anco SPA
Aluminum Stearate	Anco Sperse
Aluminum Sulfate	Anco Starch (W-Y)
Amaizo Starch	Anco Trol
Ammonium Nitrate	Anco Vis N. S.
Ammonium Bifluoride	Anco Zan
Amonium Phosphate	AncoVis L

Antifoam D046
APB-1
APB-1 Ammonium Persulfate Breaker
Aqua Clear NA Minus
Aqua Clear Salt Dissolver
Aqua Pac
Aquabloc
AQUET 921 Emulsifier
ARFLOW
Asphasol Supreme
B9
Bara-Defoam
Barazan D Plus
Barite
Barite
Barite D31
Barium Sulfate
Baroid
Baro-Seal
Basic Cements Enabler D201
Bentone 38
Bentone 910
Bentonite
Bentonite Extender D20
Benzoic Acid
BIO ADD 7555
BIO COR 2899
Bioban CS-1135
Bio-Clear 1000
Bio-Clear 200
Bio-Lose
Biozan
Blackseal
Bromocresol Green-Methyl Red Indicator
Bug X Deet Insect Repellent Towelette
BXL-2
BXL-2
Cal Carb Mix
Calcium Carbonate
Calcium Carbonate D151
Calcium Chloride
Calcium Chloride 77-80% Flake
Calcium Hypochlorite
Calcium Hypochlorite
CARBOPRO (All Mesh Sizes)
Casing Inhibitor

Caustic Potash-Flake
Caustic Soda
Cedar Fiber
Cellosoze Polymer HEC-18
Cellophane Flakes
Cement
Cement Class A D901
Cenospheres
CFL-25
Chem-Seal
CI-300A
CITGO Gasolines - All Grades
CITGO No.1 Diesel Fuel - All Grades
CITGO Pacemaker Engine Oil 1015
CITGO Pacemaker Engine Oil 1615
CITGO Pacemaker Engine Oil 1715
Citric Acid
Citric Acid Soln 50
Citric%20 Acid, %20 Anhydrous
CLA-CHEK A
CLA-CHEK LP
Clearstick 505
Clearstick 505 Soap Stick
Condensate
Cottonseed Hulls
Crumb Rubber
Crystalline Silica
CS-250
CS-250 SI
CS-650 OS
CS-Polybreak 210
CYANAFLO 105L Polymer Additive
Defoam X
Desco
Desco CF
DF-450
DF-650
DF-900
DI Water
Diald 25
DIALD25
Diaseal M
Diesel Fuel
Diesel Fuel-High Sulfur
Diesel Fuel-Low Sulfur
Diesel-Mate Clear

Methanol
Methyl Purple Indicator
MF-55
M-I Bar
MI GEL
MI WATE
Mica
Mica (F, C)
Microspheres
Mil-Glide
Mil-Pac All Grades
MilStarch
MIX II
M-I-X II
MRA
Mud Safe CR
MUDPUSH II Spacer D182
Multi-Chem B-8642
Multi-Chem B-8650
Multi-Chem C-6003
Multi-Chem DFv7120
Multi-Chem EB 1085
Multi-Chem FA 4012
Multi-Chem FA-4100
Multi-Chem FA-4211
Multi-Chem FS-7584
Multi-Chem HI-1000
Multi-Chem M-8172
Multi-Chem MX 14-5
Multi-Chem MX 4-1201
Multi-Chem MX 525-5
Multi-Chem MX 822-5
Multi-Chem MX 894-7
Multi-Chem MX 915-5
Multi-Chem S-2009
Multi-Chem S-2510T
Multi-Chem S-2530
Multi-Chem SS-5075
Multi-Chem SS-5189
Multi-Chem SS-5339
Multi-Chem SS-5359
Multi-Chem SS-5651
Multi-Seal
Myacide
N-17 Formula Antifreeze & Coolant
NE 100

NE 100 (winterized)
New 100 N
New PHALT
New PHPA
New Xan
NewBar
New-Drill
NewEase 203
NewPHPA
NewPlug
NoFoam A
NoFoam X
North 222 Barrier Cream
Nutshell (F, M, C)
OAI-815
Oil Base Mud
Oil Dry
OILSORB
Organolig
Ox-Breaker
Oxygen Scavenger ABS-N 70%
Para-Clear D-290
Paranox
Parasol II
Parasurf
PB Blaster
Pecan Nut Plug
Perma-Lose HT
PERMASEAL
Pheno Seal
PHPA DSL015822
Pipe Lax
Poly Pac R
Poly Plus
Poly Sticks
Polymer Beads
PolyPac Plus
PolyPac UL/ELV
PolyPlus RD
Polyswell
Portland Cement
Potassium Acetate
Potassium Chloride (KCL)
Potassium Chloride Solid
Potassium Chromate Solutions
Premium Poly Beads

Propane
Pump Kleen
Q40-200
Quartz
Quick Slide
Reb-Kleen
Rebound
Red Stripe
Resin Coated Silica
Rid Rust
Sack Fishing Tool
Safe Carb
Safe Scav HSW
Safety-Kleen Premium Solvent
Salt Gel
SAPP
Sawdust
Sea Mud
Shale Surf 1000
Shale Surf 1000 (winterized)
Shur Plug
Silica Sand
Silver Nitrate
SILVERSEAL
So Lube 1000
Soap Sticks
Soda Ash
Soda Ash, Dense
Sodium Bicarbonate
Sodium Chloride
Sodium Chloride Solid
Sodium Hydroxide (Caustic Soda)
Sodium Tripolyphosphate Anhydrous
Soltex
Enviro Safe Mud Lubricant
Starch (W&Y)
Sulfamic Acid
Sulfatrol
Sulfuric Aid
Sunsweep
Super Slide Glass Beads (F,M, C, & Mega)
Super Surf
Super Sweep
Tannathin
Terra-Rate
TI-2

TIC D65 Dispersant
Tork Buster
Tork Buster Plus
Transfoam-A1
Trisodium Phosphate
TRU VIS
UNIBAC
UNI-FLO
UNIFLO 2
UNIFOAM
Unigel 19XL
Unigel 1XLR
Unigel 5F
Unihib A
UNILINK BXL
USG Hydrocal
UWS AGA-150
UWS BXL-A
UWS CFL-117
UWS CR-220
UWS NCL
UWS NDL-100
UWS NE-50
UWS NE-70
UWS NE-80
UWS NE-90
Variseal
Versa HRP
Versamod
Walnut Shells
Water Hardness Buffer
Water Hardness Indicators
WD-40
White Starch
WO Defoam
Wolfs Head Lubricating Grease
WT-22
Wyoming Sodium Bentonite
Xan-Plex D
X-Cide 102
X-Cide 207
X-Tend Lube Plus
X-Tend VIS
XX-Polymer
ZEP 45 Liquid
ZEP Cherry Industrial Hand Cleaner

ZEP Elec II Plus
ZEP Redi-Grease
ZEP Super Penetrant

ZEP Wasp & Hornet Killer
Zinc Carbonate



GATEWAY

On Call On Time On Target

THE GATEWAY ENGINEERS, INC.

400 HOLIDAY DRIVE, SUITE 300
PITTSBURGH, PA 15220-2727
412.921.4030 PHONE
412.921.9960 FAX

www.gatewayengineers.com

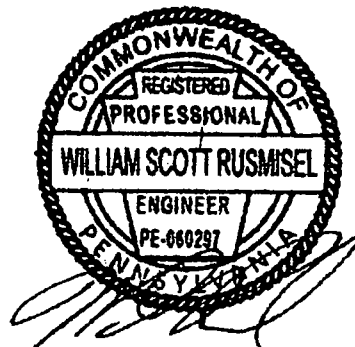
EROSION AND SEDIMENTATION CONTROL PLAN NARRATIVE

Made For

**RANGE RESOURCES – APPALACHIA, LLC
YEAGER WELL PAD**

Situate In

**AMWELL TOWNSHIP
WASHINGTON COUNTY, PA**



I do hereby certify to the best of my knowledge, information and belief, that the Erosion and Sediment Control Plan and Site Restoration Plan and Post Construction BMPs are true and correct, represent actual field conditions and are in accordance with the 25 Pa. Code Chapters 78 and 102 of the Department's rules and regulations. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

WATERSHED CLASSIFICATION: BANE CREEK (TSF)
RECEIVING STREAM (USGS BLUE LINE): UNT TO BANE CREEK (TSF)
DISTANCE TO NEAREST USGS BLUE LINE STREAM: 80+/- FT.
NO ANTICIPATED WETLAND IMPACTS

C-17523-0023

Date: June 19, 2009

Revised: January 18, 2010

THE GATEWAY ENGINEERS, INC.

Prepared By: James Martin, P.E.

Reviewed By: W. Scott Rusmisl, P.E.

A FULL SERVICE CIVIL ENGINEERING FIRM

MUNICIPAL ENGINEERING • LAND DEVELOPMENT
SURVEYING • G.I.S. MAPPING • LANDSCAPE ARCHITECTURE

MISSION STATEMENT

TO HELP OUR CLIENTS REACH A HIGHER
LEVEL OF SUCCESS THROUGH KNOWLEDGE,
EXPERIENCE AND RESPONSIVENESS.

EROSION AND SEDIMENTATION CONTROL PLAN NARRATIVE

PLAN NAME: Yeager Well Pad

LOCATION: Amwell Township, Washington County, PA.

Chapter 93 Watershed Classification: Receiving stream is an Unnamed Tributary to Bane Creek which is classified as a Trout Stocking Fishery (TSF).

Past and Present Land Uses: The site proposed for construction of the well pad consists of area used for farming/agriculture and is partially wooded.

The following narrative is accordance with PA Title 25, Chapter 102 Rules and Regulations, Section 102.5:

102.5 (b) The erosion and sedimentation control plan shall be designed to prevent accelerated erosion and sedimentation and shall consider all factors which contribute to erosion and sedimentation including, but not limited to, the following:

102.5(b)(1) The topographic features of the project area.

Existing contours are shown on the attached Erosion and Sedimentation Control Plan at 2 foot intervals.

102.5(b)(2) The types, depth, slope and aerial extent of the soils.

Refer to Appendix B for on-site soils information.

102.5(b)(3) The proposed alteration to the area.

The proposed alterations to the project area include construction of a well pad, frac pond/freshwater impoundment and access road for use in drilling the Marcellus shale. The proposed development will disturb approximately 25.0+/- acres.

(a) Explain erosion and sedimentation control function of permanent site features and/or facilities.

Any non-stabilized (by compacted gravel) disturbed area will be seeded with a mixture specified in the planting specifications.

(b) Indicate how and where topsoil will be removed, temporarily stockpiled, and then replaced.

Topsoil will be stripped and stockpiled on-site at the approximate locations shown on the Erosion & Sedimentation Control Plan.

Stockpiled topsoil will be utilized when returning the site to original conditions.

102.5 (b)(4) The amount of runoff from the project area and the upstream watershed area and the method of calculation used.

(a) Watershed boundaries on and off site.

The watershed boundaries are shown by the existing topography and proposed grades on the Erosion and Sedimentation Control Plan. See appendix for runoff calculations.

(b) Show that all discharge points are in compliance with section 102.13 with regard to allowable velocity.

Proposed cross drains outfall to well-vegetated, stabilized filter strip areas. The traps and all temporary channels will be removed and the land will be reclaimed at the completion of drilling operations.

102.5 (b)(5) The staging of earthmoving activities.

(a) Construction Sequence

The Yeager Property drilling project will consist of the construction and maintenance of a well pad, access road, and construction of erosion and sedimentation controls. All E&S facilities shall be installed in accordance with the approved E&S/SWM Plan and the DEP Erosion and Sediment Pollution Control Program Manual dated July, 2001 or latest version.

A generalized construction sequence is provided below. The construction sequence is intended to provide a general course of action in order to conform to the applicable regulatory agency requirements for temporary and permanent soil erosion and sediment pollution control. All necessary parts for proper and complete execution of work pertaining to this plan, whether specifically mentioned or not, are to be performed by the contractor. It is not intended that the drawings and this report show every detailed piece of material or equipment. The contractor shall comply with all requirements listed in this section. The contractor may be required to alter controls based on effectiveness of controls or differing conditions encountered.

Note: Construction of well pad and frac pond may occur in any order or simultaneously.

WELL PAD:

- 1. Stake out limit of disturbance for grading operations. In addition, orange**

- construction fence shall be placed around any and all environmental features to be protected on the site.
2. Install rock construction entrance with culvert at gravel access road off of McAdams Road as shown on the plan drawings according to the construction detail prior to grading access road to site. Install rock filter below construction entrance as shown on plan.
 3. Install 30" silt fence below area of grading operations for proposed access road.
 4. Clear and grub area of proposed access road construction.
 5. Begin grading operations for access road and stabilize with gravel surface, installing turnouts and cross drains where needed according to the details provided as shown on plan. Once access road is stabilized with gravel, rock construction entrance can be removed.
 6. Install rock filter along access road as shown on plan.
 7. Install super silt fence and 30" silt fence below proposed areas of disturbance as shown on the plan.
 8. Clear area for construction of Sediment Trap 1.
 9. Construct Embankment Sediment Trap 1 as shown on plan and per the details provided. Install clean out stake, emergency spillway, and seed and mulch for stabilization.
 10. Begin construction of temporary interceptor channels ICT-1 and ICT-2. Install channel liners and seed and mulch for stabilization.
 11. Clear and grub remainder of area for well pad construction as indicated by the limit of disturbance on the plan.
 12. Clear topsoil at the area of proposed well pad and stockpile at the nearest location as shown on the plans.
 13. Begin grading operations for construction of well pad and production pad. As soon as site is brought to final grade, immediately install erosion control blanket and seed and mulch for stabilization in regular 15' vertical increments to promote early stabilization of the slopes.
 14. Complete construction of well pad and production pad and complete seeding and mulching of all slopes.

SITE RESTORATION PLAN (WELL PAD):

15. Once drilling operations are complete, the well pad shall be removed. A reduced pad stabilized with gravel of approximate dimensions of 100' x 100' shall remain with maximum 3:1 slopes meeting the restored grades. Grading shall be so as to restore the existing contours prior to construction.
16. Replace topsoil, seed and mulch all disturbed areas, using the specified seeding requirements found on the detailed plan. All disturbed areas must be temporarily stabilized if remaining idle, or anticipated to remain idle. In the absence of a soil test, lime should be added at a rate of 275 lbs / 1000 s.f. Likewise, the fertilizer rates should be increased to 1250 lbs/ac. of 8-16-16 and 2000 lbs/ac of 5-10-10.
17. Reseed all disturbed areas if vegetation is not established after 30 days.
18. Remove temporary interceptor channels ICT-1 & ICT-2; re-grade areas to conditions prior to construction. Seed and mulch all disturbed areas.

19. Remove Sediment Trap 1; re-grade area to conditions prior to construction. Seed and mulch all disturbed areas.
20. Remove all filter fence and rock filter following completion of the above steps and after site has a uniform 70% perennial vegetative cover on unpaved areas.

FRAC POND:

1. Stake out limit of disturbance for grading operations. In addition, orange construction fence shall be placed around any and all environmental features to be protected on the site.
2. If access road has not been previously installed, install rock construction entrance with culvert at gravel access road off of McAdams Road as shown on the plan drawings according to the construction detail prior to grading access road to site. Install rock filter below construction entrance as shown on plan.
3. Install 30" silt fence below area of grading operations for proposed access road.
4. Clear and grub area of proposed access road construction.
5. Begin grading operations for access road and stabilize with gravel surface, installing turnouts and cross drains where needed according to the details provided as shown on plan. Once access road is stabilized with gravel, rock construction entrance can be removed.
6. Install super silt fence and 30" silt fence below areas of disturbance below the sediment traps and pond embankment as shown on plan.
7. Clear and grub in areas of traps 2, 3, 4, and 5. Clear topsoil in areas of traps and stockpile at location shown on plan.
8. Construct Embankment Sediment Traps 2, 3, 4 and 5 as shown on plan and per the details provided. Install clean out stakes, emergency spillways, and seed and mulch for stabilization. Install pipe slope drain below trap 2 as shown on plan and per the detail provided.
9. Clear area for and begin construction of temporary Interceptor channels ICT-3, ICT-4, ICT-5, ICT-6, ICT-7, ICT-8 and ICT-9. Seed and install channel liners for stabilization.
10. Clear and grub remainder of area for frac pond construction as indicated by the limit of disturbance on the plan.
8. Clear topsoil at the area of proposed frac pond and stockpile at the nearest location as shown on the plans.
9. Begin grading operations for construction of frac pond. As soon as site is brought to final grade, immediately seed and mulch or install erosion control blanket for stabilization in regular 15' vertical increments to promote early stabilization of the slopes.
10. Complete construction of frac pond and complete seeding and mulching or erosion control blanket installation on all slopes. Complete seeding and mulching of all disturbed areas not stabilized by gravel or erosion control blanketing.
11. Install impermeable liner.

SITE RESTORATION PLAN (FRAC POND):

12. Once frac operations are complete, impoundment shall be filled and site shall be restored to original topography. Drain frac pond and remove liner. Dewater using pumped water filter bag as necessary. Replace topsoil on all slopes, seed and mulch all disturbed areas, using the specified seeding requirements found on the detailed plan. All disturbed areas must be temporarily stabilized if remaining idle, or anticipated to remain idle. In the absence of a soil test, lime should be added at a rate of 275 lbs / 1000 s.f. Likewise, the fertilizer rates should be increased to 1250 lbs/ac. of 8-16-16 and 2000 lbs/ac of 5-10-10.
13. Reseed all disturbed areas if vegetation is not established after 30 days.
14. Remove temporary Interceptor channels ICT-3, ICT-4, ICT-5, ICT-6, ICT-7, ICT-8 and ICT-9; re-grade areas to conditions prior to construction. Seed and mulch all disturbed areas.
15. Remove embankment sediment traps 2, 3, 4 and 5; re-grade areas to conditions prior to construction. Seed and mulch all disturbed areas.
16. Remove all filter fence and rock filter following completion of the above steps and after site has a uniform 70% perennial vegetative cover on unpaved areas.

102.5 (b)(6) Temporary control measures and facilities for use during earthmoving.

Control measures and facilities such as filter fabric fence, rock filters, sediment traps, slope blanketing, temporary channels, and temporary seeding will be utilized to control erosion and sedimentation and prevent sediment from leaving the site. See details included in the plans and details.

102.5 (b) (7) Permanent control measures and facilities for long term protection; and use during earthmoving.

Permanent control measures include cross drains and permanent seeding. Vegetative surface stabilization specifications have been included on the attached Erosion and Sedimentation Control Detail Sheet.

102.5 (b)(8) A maintenance program for the control facilities including disposal of materials removed from the control facilities or project area.

A Maintenance Schedule for the erosion and sedimentation control measures and facilities is included in the attached plans and details. The maintenance of all temporary and permanent erosion and sedimentation control facilities is the responsibility of the contractor(s).

Procedures which ensure that the proper measures for the recycling or disposal of materials associated with or from the project site will be

undertaken in accordance with Department regulations.

All construction wastes including, but not limited to temporary BMPs, excess soil materials, concrete wash water, sanitary wastes, and any materials that could adversely impact water quality must be disposed of properly at an approved DEP waste site.

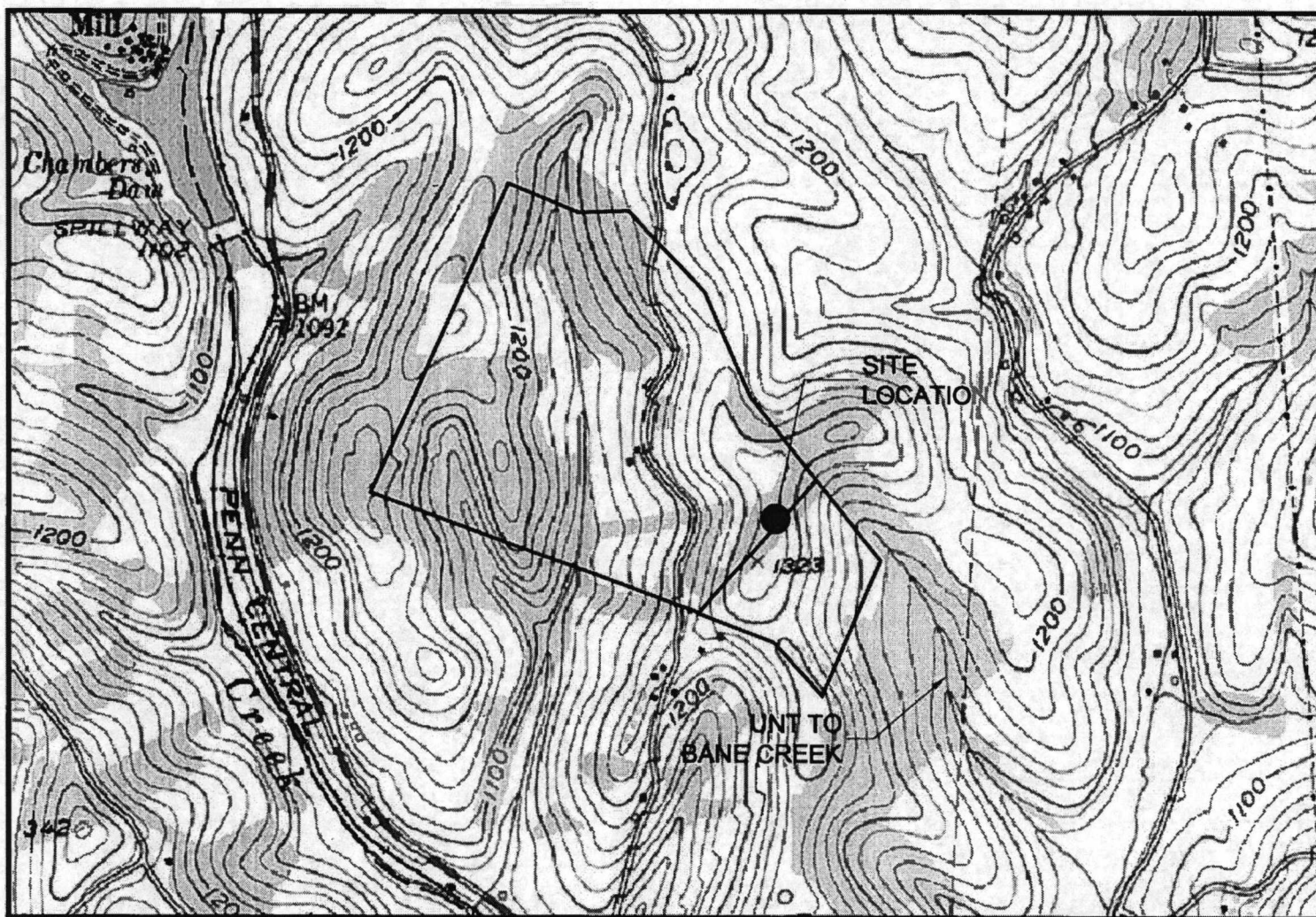
No offsite borrow or waste areas are anticipated due to balanced earthwork quantities on site. Stripped topsoil will be replaced on site upon restoration.

G:\Projects\17000\17523 Range Resources\0023 Yeager Well Pad\Doc's\Engineering\E & S\ES-REPORT.doc

Appendices Table of Contents

Appendix A	U.S.G.S. Location Map, Amity quadrangle
Appendix B	Washington County Soils Survey
Appendix C.....	Sediment Trap Calculations
Appendix D	Channel Calculations
Appendix E.....	Report Preparer Qualifications

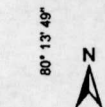
Appendix A



SITE LOCATION MAP
N.T.S.
USGS AMITY QUAD

Appendix B

Soil Map—Greene and Washington Counties, Pennsylvania









































Map Scale: 1:1,970 if printed on A size (8.5" x 11") sheet.

0	15	30	60	90
Meters				
0	50	100	200	300
Feet				

Soil Map—Greene and Washington Counties, Pennsylvania

MAP LEGEND

	Area of Interest (AOI)		Very Stony Spot
	Soils		Wet Spot
	Soil Map Units		Other
Special Point Features		Special Line Features	
	Blowout		Gully
	Borrow Pit		Short Steep Slope
	Clay Spot		Other
	Closed Depression	Political Features	
	Gravel Pit		Cities
	Gravelly Spot	Water Features	
	Landfill		Oceans
	Lava Flow		Streams and Canals
	Marsh or swamp	Transportation	
	Mine or Quarry		Rails
	Miscellaneous Water		Interstate Highways
	Perennial Water		US Routes
	Rock Outcrop		Major Roads
	Saline Spot		Local Roads
	Sandy Spot		
	Severely Eroded Spot		
	Sinkhole		
	Slide or Slip		
	Sodic Spot		
	Spoil Area		
	Stony Spot		

MAP INFORMATION

Map Scale: 1:1,970 if printed on A size (8.5" × 11") sheet.

The soil surveys that comprise your AOI were mapped at 1:15,840.

Please rely on the bar scale on each map sheet for accurate map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: <http://websoilsurvey.nrcs.usda.gov>
Coordinate System: UTM Zone 17N NAD83

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Greene and Washington Counties, Pennsylvania
Survey Area Data: Version 5, Dec 3, 2008

Date(s) aerial images were photographed: 4/7/1993

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Greene and Washington Counties, Pennsylvania (PA811)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
DoB	Dormont silt loam, 3 to 8 percent slopes	3.7	36.8%
DiD	Dormont-Culleoka silt loams, 15 to 25 percent slopes	0.2	2.2%
DiF	Dormont-Culleoka silt loams, 25 to 50 percent slopes	2.9	29.0%
WeD	Weikert-Culleoka complex, 15 to 25 percent slopes	3.2	31.9%
Totals for Area of Interest		10.1	100.0%

Appendix C

STANDARD WORKSHEET #8

Sediment Trap Data

PROJECT NAME: YEAGER WELL PAD
 LOCATION: _____
 PREPARED BY: JDM DATE: _____
 CHECKED BY: _____ DATE: _____

TRAP NUMBER		1			
DRAINAGE AREA (5 ACRES MAX) AC		3.3			
REQUIRED CAPACITY (2000 CF/AC) CF		6600			
* AVERAGE BOTTOM LENGTH (FT)		80			
* AVERAGE BOTTOM WIDTH (FT)		15			
BOTTOM ELEVATION (FT)		1261.00			
TOP OF EMBANKMENT ELEVATION		1266.00			
CREST OF SPILLWAY ELEVATION		1265.00			
CLEAN-OUT ELEVATION (@ 700CF/AC)		1262.60			
FLOW LENGTH/WIDTH RATIO (2:1 MIN)		16.3			

EMBANKMENT SPILLWAYS

OUTLET WIDTH (FT) (GREATER OF 2 x # AC OR 2 x h)		8			
OUTLET SIDE SLOPES (2:1 MIN.)		2:1			

RISER PIPE SPILLWAYS

Dr (RISER DIAMETER, 8" MIN.)					
Db (BARREL DIAMETER, 6" MIN.)					
BARREL OUTLET ELEVATION (FT)					
MAX WATER SURFACE ELEVATION (@ 1.5 CFS/AC. DISCHARGE)					

OUTLET BASIN

LENGTH (6 Db)	Ft.				
WIDTH (3 Db)	Ft.				
RIPRAP PROTECTION (Size)					

* For Irregular shaped traps, provide stage storage data.

NOTE: Add data from this worksheet to worksheet #9 or #10 and show information on plan drawings.



GATEWAY

On Call. On Time. On Target.

400 Holiday Drive, Suite 300
Pittsburgh, Pennsylvania 15220-2727
Phone: 412-921-4030
Facsimile: 412-921-9960

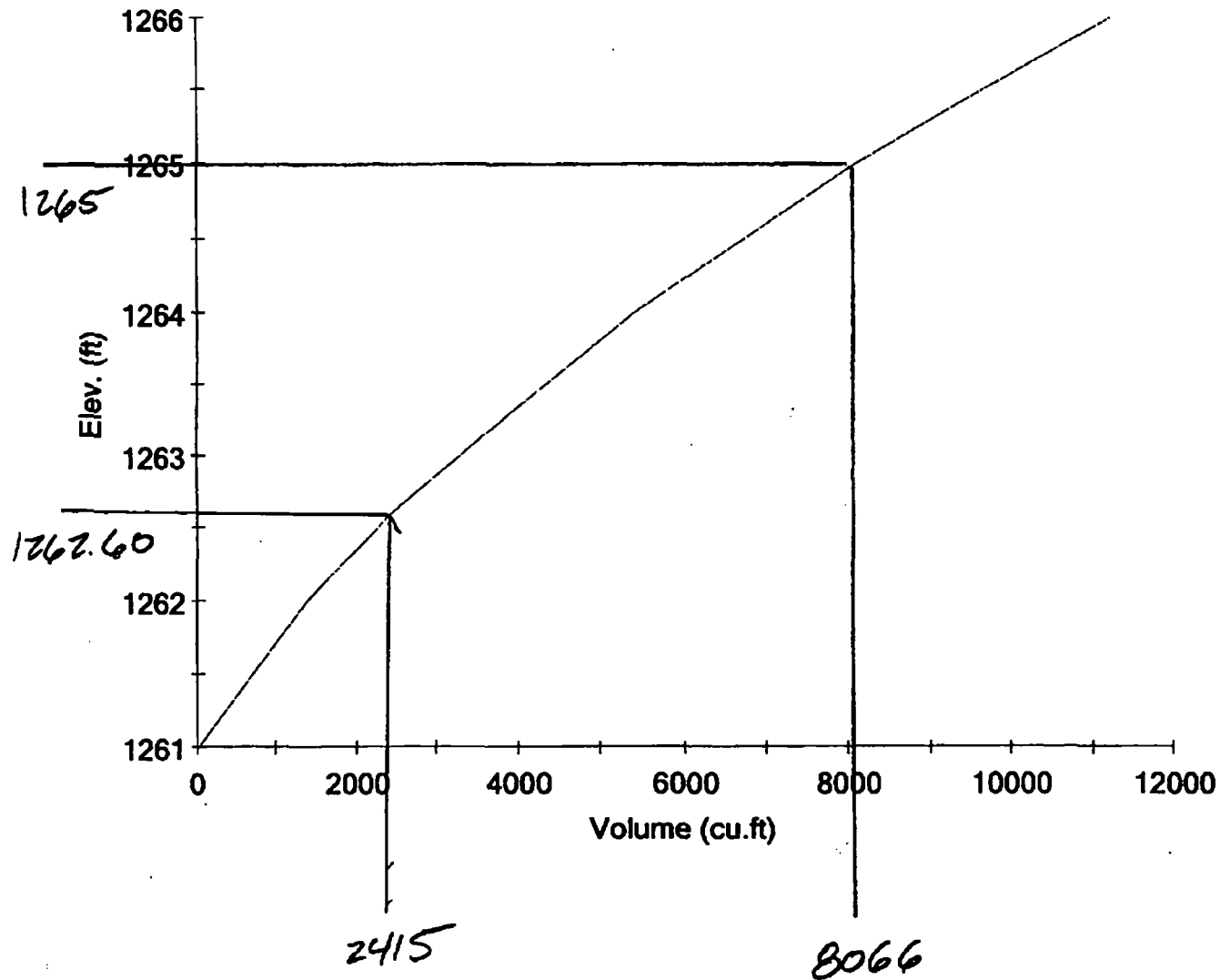
Date: June 2009
Project: Yeager Well Pad
Job No: C-17523-0023
By: JJM

Trap: 1
Drainage Area: 3.3 AC

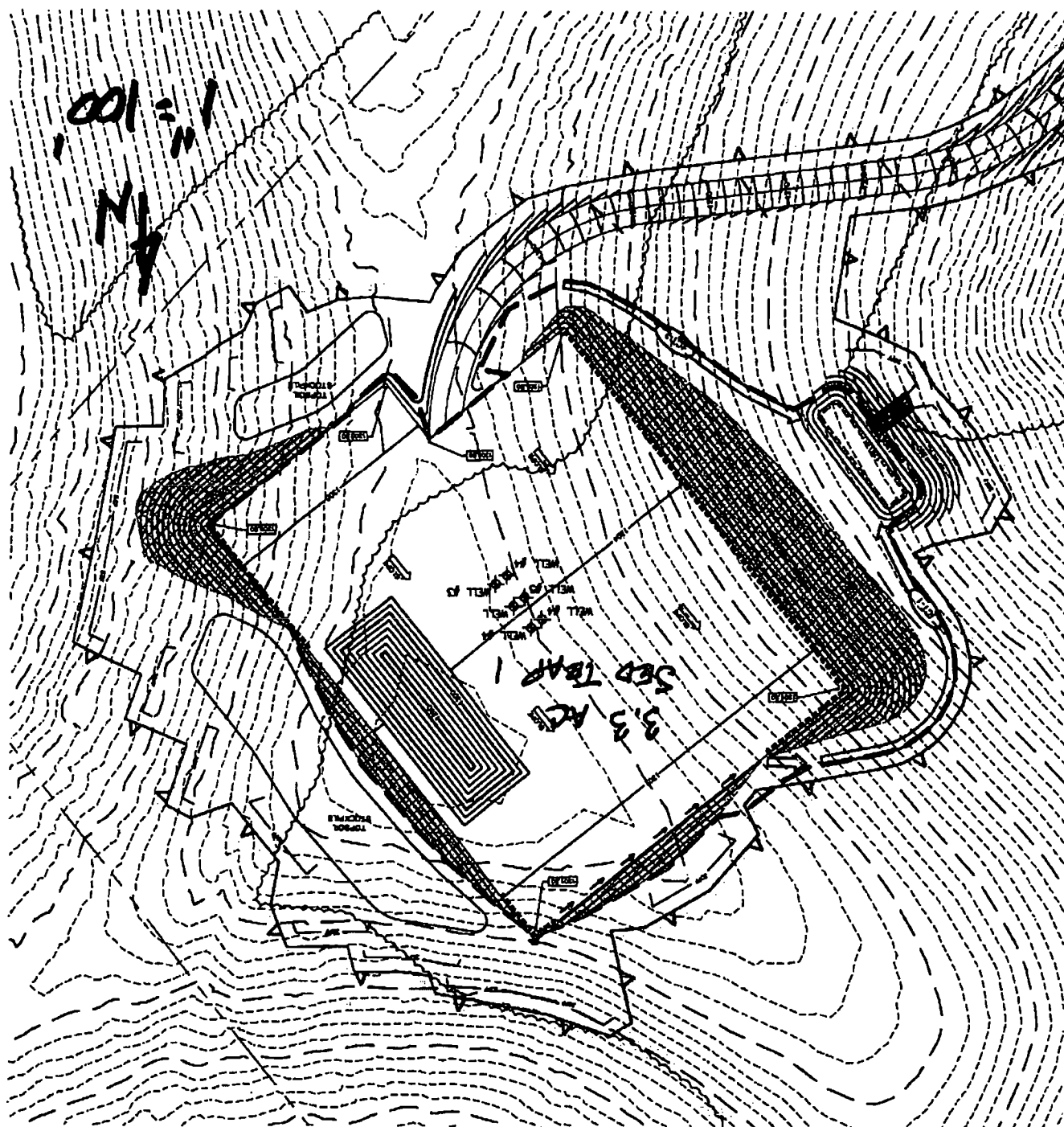
Trap Volume

Elevation	Area (SF)	Average Area (SF)	Incremental Height (FT)	Incremental Volume (CF)	Total Volume (CF)
1261.00	1197	1390	1.00	1390	1390
1262.00	1582	1709	0.60	1025	2415
1262.60	1836	2133	1.40	2986	5401
1264.00	2429	2666	1.00	2666	8066
1265.00	2903	3139	1.00	3139	11206
1266.00	3376				

Elev. vs. Volume
SED TRAP 1



— SED TRAP 1



STANDARD WORKSHEET #8
Sediment Trap Data

PROJECT NAME: YEAGER FRAC POND
 LOCATION: _____
 PREPARED BY: JDM DATE: _____
 CHECKED BY: LHR DATE: 9/17/09

TRAP NUMBER	2	3	4
DRAINAGE AREA (5 ACRES MAX) AC	3.7	5.0	3.1
REQUIRED CAPACITY (2000 CF/AC) CF	7400	10000	6200
* AVERAGE BOTTOM LENGTH (FT)	68	105	105
* AVERAGE BOTTOM WIDTH (FT)	18	15	10
BOTTOM ELEVATION (FT)	1241	1183	1179
TOP OF EMBANKMENT ELEVATION	1246	1188	1184
CREST OF SPILLWAY ELEVATION	1245	1187	1183
CLEAN-OUT ELEVATION (@ 700CF/AC)	1242.7	1184.5	1180.6
FLOW LENGTH/WIDTH RATIO (2:1 MIN)	3.77:1	6:1	10.5:1

EMBANKMENT SPILLWAYS

OUTLET WIDTH (FT) (GREATER OF 2 x # AC OR 2 x h)	8	10	8
OUTLET SIDE SLOPES (2:1 MIN.)	2:1	2:1	2:1

RISER PIPE SPILLWAYS

Dr (RISER DIAMETER, 8" MIN.)				
Db (BARREL DIAMETER, 6" MIN.)				
BARREL OUTLET ELEVATION (FT)				
MAX WATER SURFACE ELEVATION (@ 1.5 CFS/AC. DISCHARGE)				

OUTLET BASIN

LENGTH (6 Db)	Ft.				
WIDTH (3 Db)	Ft.				
RIPRAP PROTECTION (Size)					

* For Irregular shaped traps, provide stage storage data.

NOTE: Add data from this worksheet to worksheet #9 or #10 and show information on plan drawings.



GATEWAY

On Call. On Time. On Target.

400 Holiday Drive, Suite 300
Pittsburgh, Pennsylvania 15220-2727
Phone: 412-921-4030
Facsimile: 412-921-9960

Date: September 2009

Project: Yeager Frac Pond

Job No: C-17523-0023

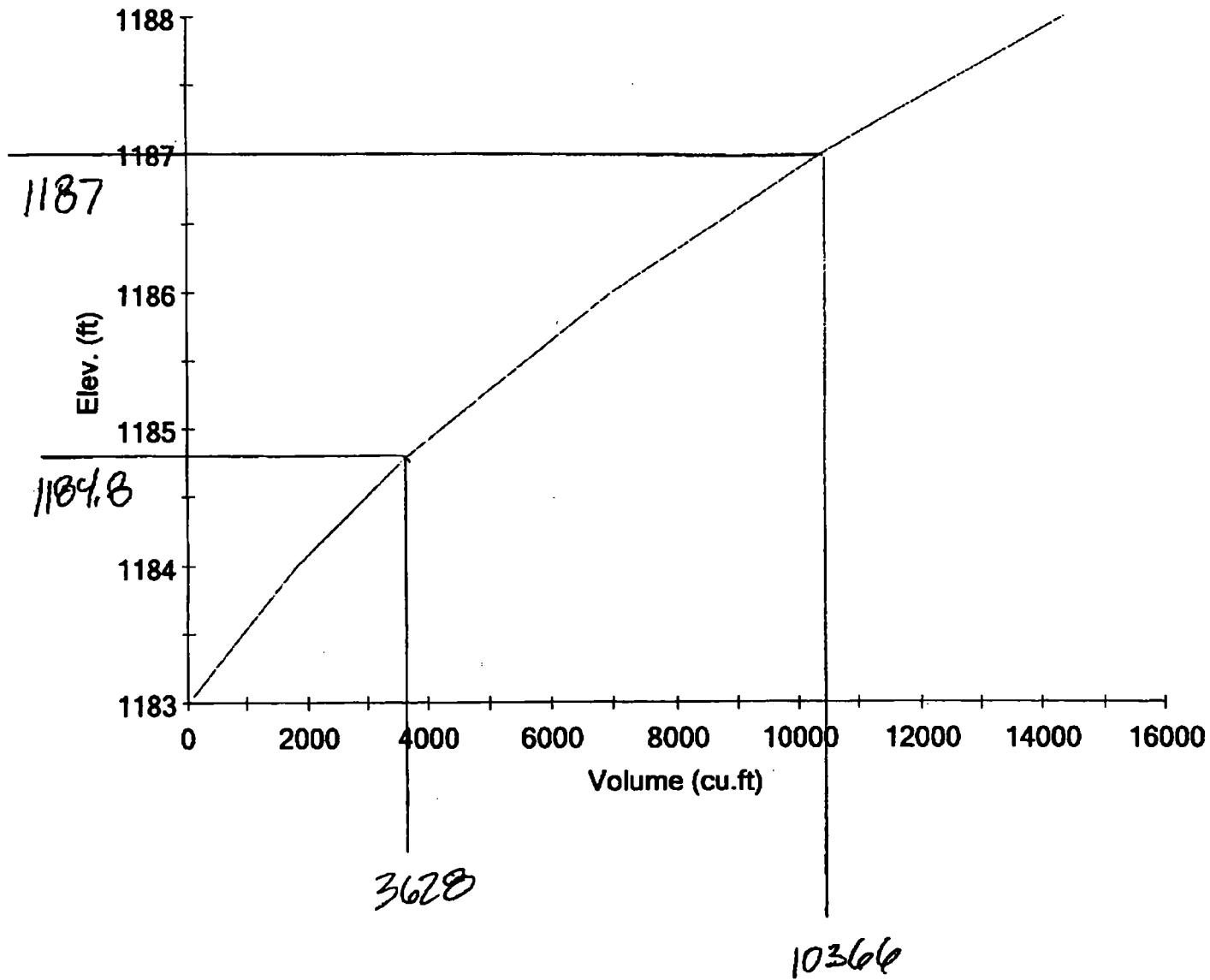
By: JJM

Trap: 3
Drainage Area: 5.0 AC

Trap Volume

Elevation	Area (SF)	Average Area (SF)	Incremental Height (FT)	Incremental Volume (CF)	Total Volume (CF)
1183.00	1572	1815	1.00	1815	1815
1184.00	2057	2266	0.80	1813	3628
1184.80	2476	2790	1.20	3348	6976
1186.00	3104	3391	1.00	3391	10366
1187.00	3678	3964	1.00	3964	14331
1188.00	4251				

Elev. vs. Volume
TRAP 3





GATEWAY

On Call. On Time. On Target.

400 Holiday Drive, Suite 300
Pittsburgh, Pennsylvania 15220-2727
Phone: 412-921-4030
Facsimile: 412-921-9960

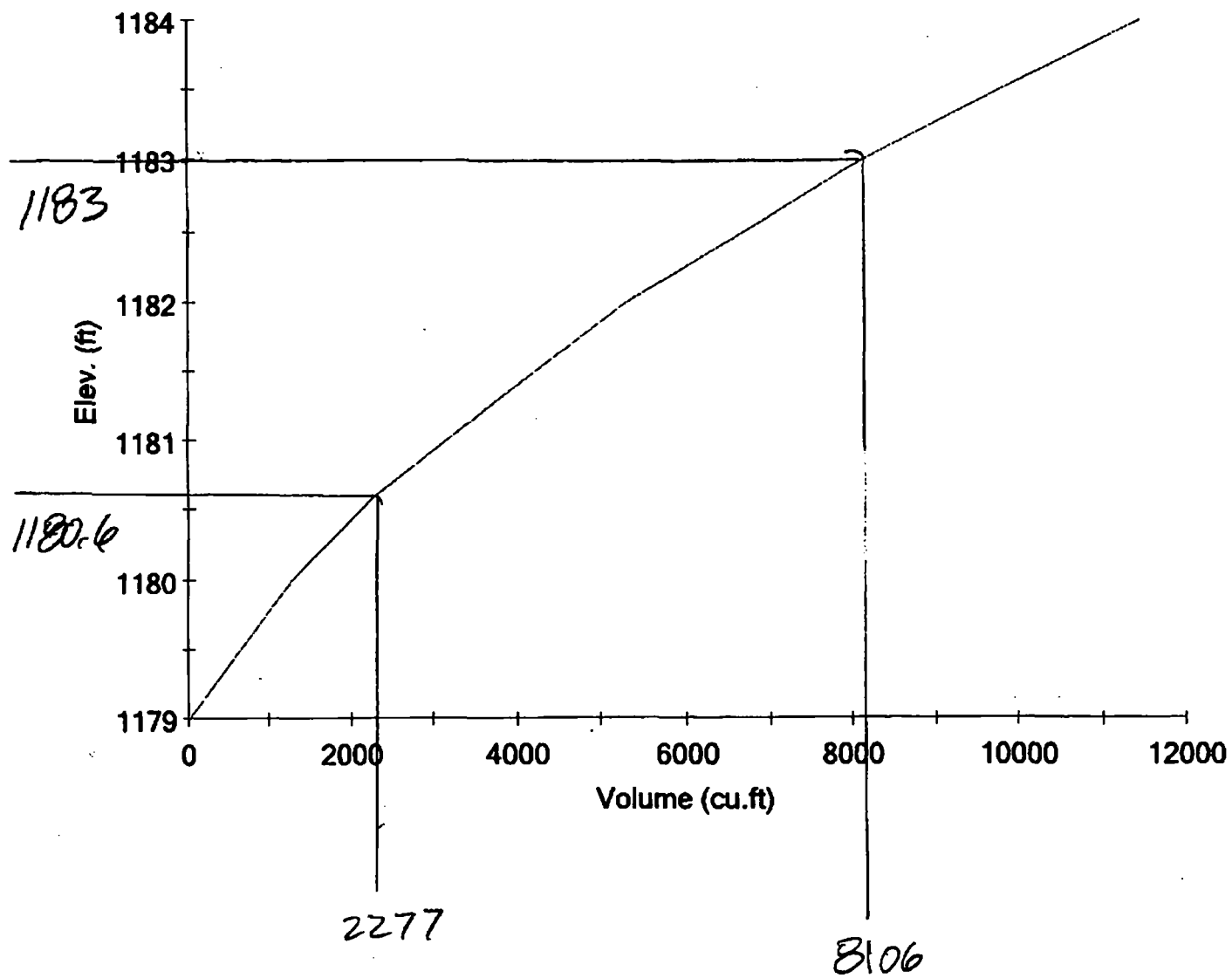
Date: September 2009
Project: Yeager Frac Pond
Job No: C-17523-0023
By: JJM

Trap: 4
Drainage Area: 3.1 AC

Trap Volume

Elevation	Area (SF)	Average Area (SF)	Incremental Height (FT)	Incremental Volume (CF)	Total Volume (CF)
1179.00	1047				
		1280	1.00	1280	1280
1180.00	1512				
		1663	0.60	998	2277
1180.60	1814				
		2167	1.40	3033	5311
1182.00	2519				
		2796	1.00	2796	8106
1183.00	3073				
		3349	1.00	3349	11456
1184.00	3626				

Elev. vs. Volume
TRAP 4



STANDARD WORKSHEET #8
Sediment Trap Data

PROJECT NAME: YEAGER FRAC POND
 LOCATION: _____
 PREPARED BY: JJM DATE: _____
 CHECKED BY: LAR DATE: 1/2010

TRAP NUMBER		<u>2</u>		<u>5</u>	
DRAINAGE AREA (5 ACRES MAX) AC		<u>2.1</u>		<u>1.6</u>	
REQUIRED CAPACITY (2000 CF/AC) CF		<u>4200</u>		<u>3200</u>	
* AVERAGE BOTTOM LENGTH (FT)		<u>60</u>		<u>60</u>	
* AVERAGE BOTTOM WIDTH (FT)		<u>12</u>		<u>8</u>	
BOTTOM ELEVATION (FT)		<u>1241</u>		<u>1255</u>	
TOP OF EMBANKMENT ELEVATION		<u>1246</u>		<u>1260</u>	
CREST OF SPILLWAY ELEVATION		<u>1245</u>		<u>1259</u>	
CLEAN-OUT ELEVATION (@ 700CF/AC)		<u>1246.70</u>		<u>1256.60</u>	
FLOW LENGTH/WIDTH RATIO (2:1 MIN)					

EMBANKMENT SPILLWAYS

OUTLET WIDTH (FT)		<u>8</u>		<u>8</u>	
(GREATER OF 2 x # AC OR 2 x h)					
OUTLET SIDE SLOPES (2:1 MIN.)		<u>2:1</u>		<u>2:1</u>	

RISER PIPE SPILLWAYS

Dr (RISER DIAMETER, 8" MIN.)					
Db (BARREL DIAMETER, 6" MIN.)					
BARREL OUTLET ELEVATION (FT)					
MAX WATER SURFACE ELEVATION (@ 1.5 CFS/AC. DISCHARGE)					

OUTLET BASIN

LENGTH (6 Db)	Ft.				
WIDTH (3 Db)	Ft.				
RIPRAP PROTECTION (Size)					

* For irregular shaped traps, provide stage storage data.

NOTE: Add data from this worksheet to worksheet #9 or #10 and show information on plan drawings.



GATEWAY

On Call. On Time. On Target.

400 Holiday Drive, Suite 300
Pittsburgh, Pennsylvania 15220-2727
Phone: 412-921-4030
Facsimile: 412-921-9960

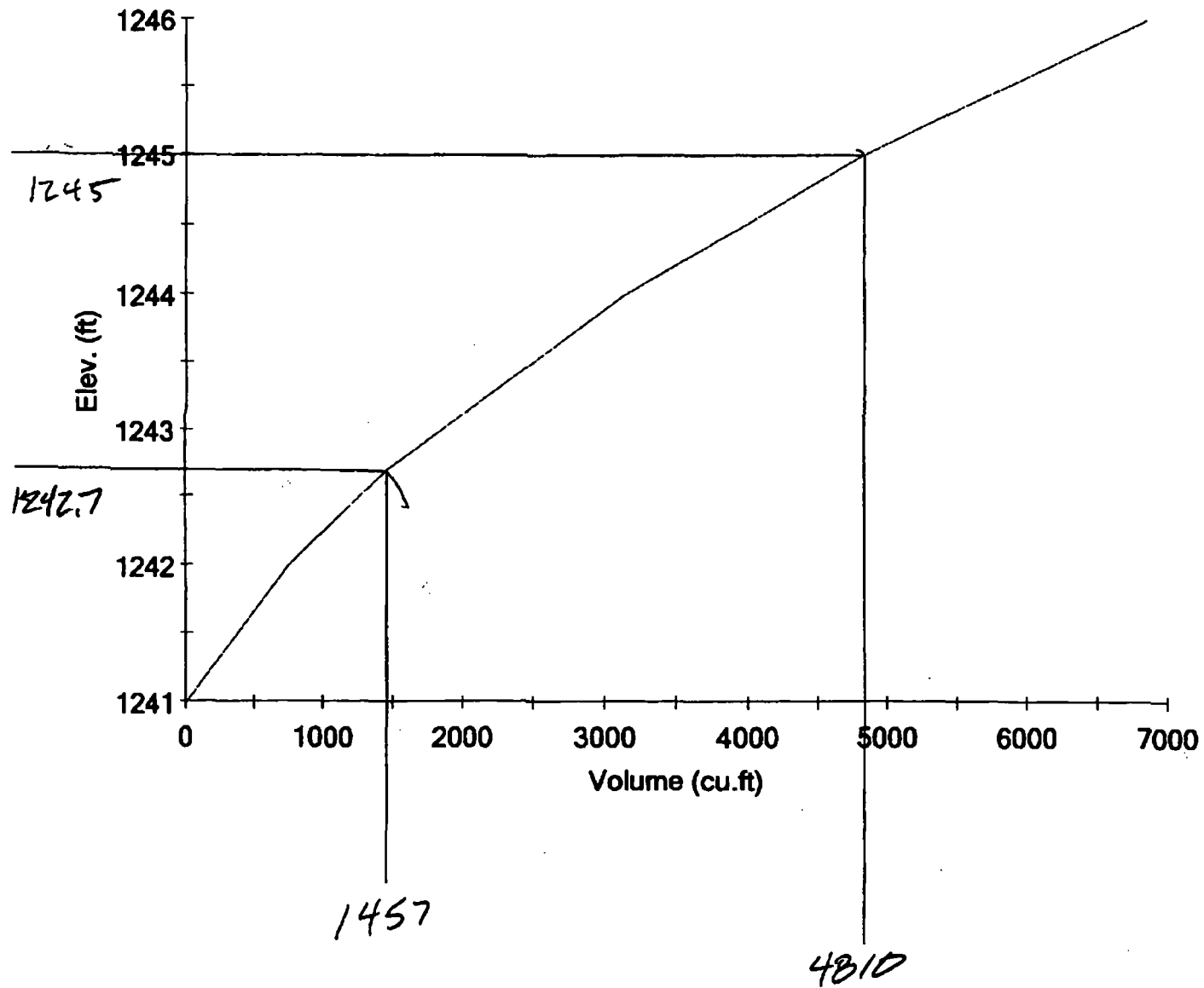
Date: January 2010
Project: Yeager Frac Pond
Job No: C-17523-0023
By: JJM

Trap: 2
Drainage Area: 2.1 AC

Trap Volume

Elevation	Area (SF)	Average Area (SF)	Incremental Hieght (FT)	Incremental Volume (CF)	Total Volume (CF)
1241.00	628	760	1.00	760	760
1242.00	891	996	0.70	697	1457
1242.70	1101	1297	1.30	1686	3143
1244.00	1492	1668	1.00	1668	4810
1245.00	1843	2019	1.00	2019	6829
1246.00	2194				

Elev. vs. Volume
TRAP 2





On Call. On Time. On Target.

400 Holiday Drive, Suite 300
Pittsburgh, Pennsylvania 15220-2727
Phone: 412-921-4030
Facsimile: 412-921-9960

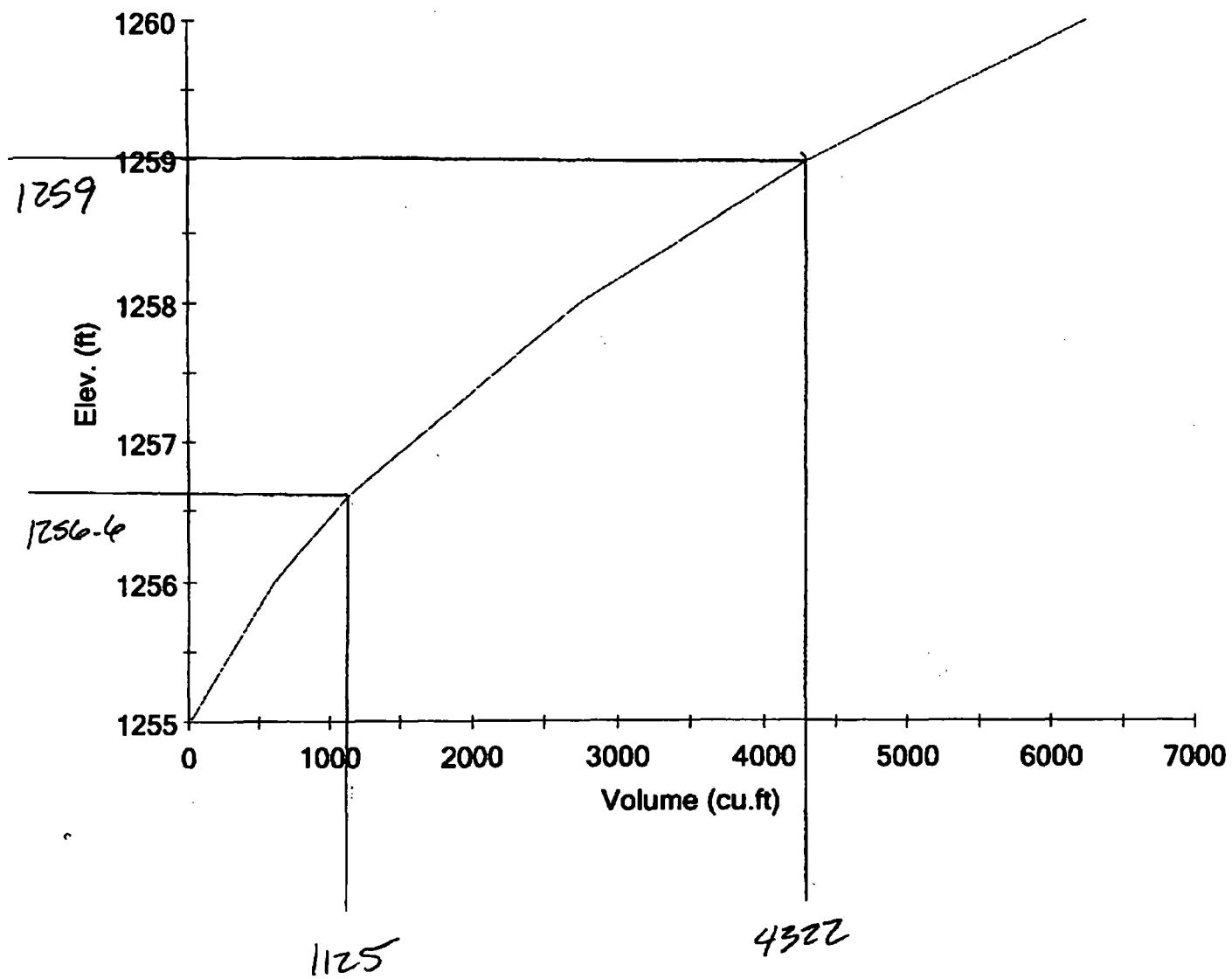
Date: January 2010
Project: Yeager Frac Pond
Job No: C-17523-0023
By: JJM

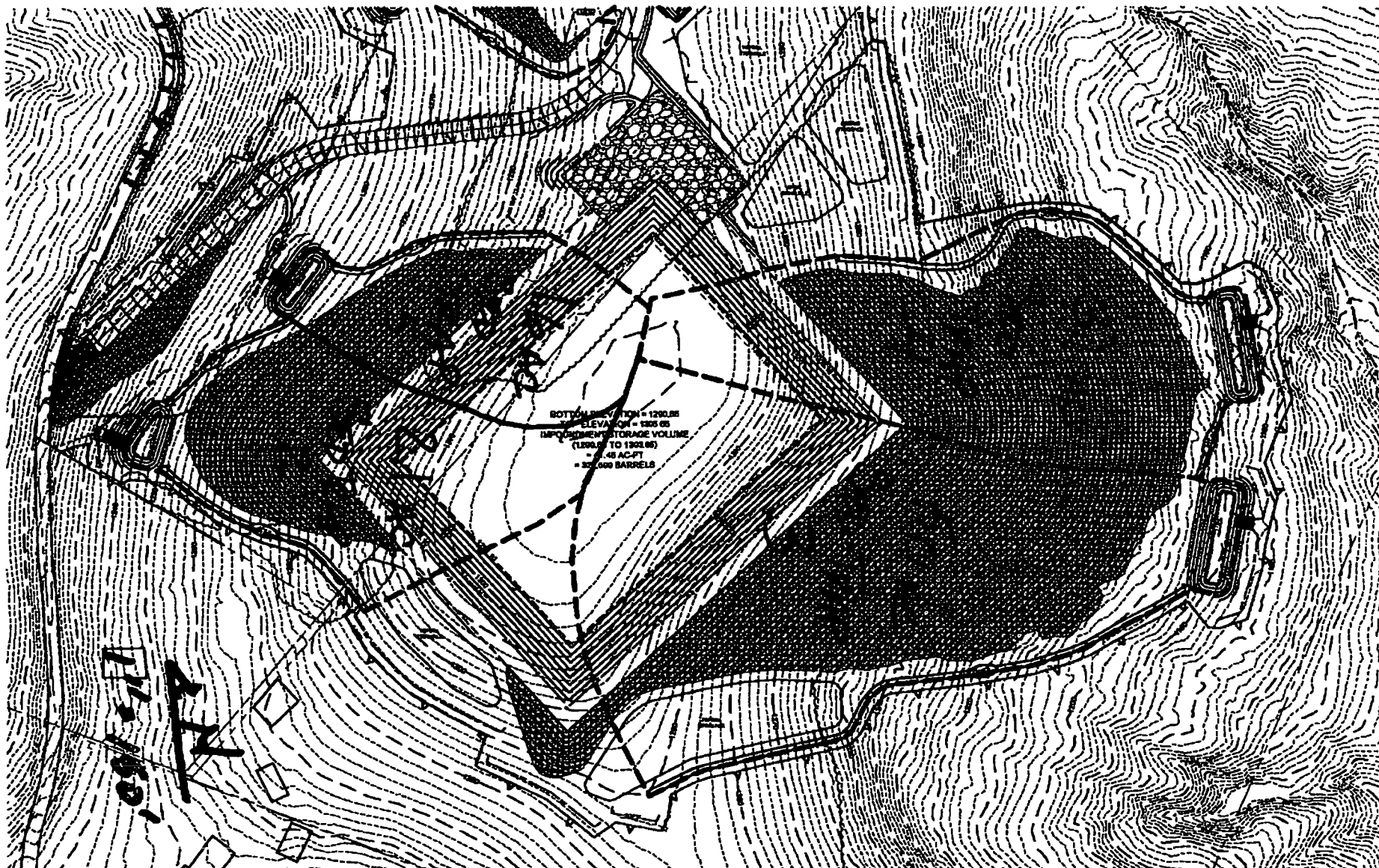
Trap: 5
Drainage Area: 1.6 AC

Trap Volume

Elevation	Area (SF)	Average Area (SF)	Incremental Height (FT)	Incremental Volume (CF)	Total Volume (CF)
1255.00	477	616	1.00	616	616
1256.00	754	849	0.60	509	1125
1256.60	943	1164	1.40	1630	2755
1258.00	1385	1568	1.00	1568	4322
1259.00	1751	1933	1.00	1933	6256
1260.00	2116				

Elev. vs. Volume
TRAP 5





Appendix D

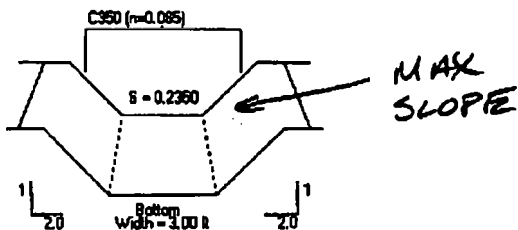
North American Green - ECMS Version 4.3
 PROJECT NAME: PROJECT NO.:
 FROM STATION/REACH: TO STATION/REACH: DRAINAGE AREA: DESIGN FREQUENCY:

HYDRAULIC RESULTS

Discharge (cfs)	Peak Flow Period (hrs)	Velocity (fps)	Area (sq.ft)	Hydraulic Radius (ft)	Normal Depth (ft)
8.4	24.0	5.25	1.60	0.33	0.42

$$0.42 + 0.5 = 0.92 < 1.5 \checkmark$$

$$0.42(12) = 5.04 > 3.0 \checkmark$$



LINER RESULTS

Not to Scale

Reach	Mailing Type	Stability Analysis	Vegetation Characteristics				Permissible Shear Stress (psf)	Calculated Shear Stress (psf)	Safety Factor	Remarks
	Staple Pattern		Phase	Class	Type	Density				
Straight	C350	Vegetation	3	C	Mix	75-85%	10.00	6.12	1.63	STABLE
	Staple E	Soil	Silt Loam				1.200	0.601	2.00	STABLE

ICT-1

$$Q = C I A$$

$$C = 0.5$$

$$I = 6.0 \text{ in/hr}$$

$$A = 2.8 \text{ AC}$$

$$Q = 8.4 \text{ CFS}$$



 NORTH AMERICAN GREEN EROSION CONTROL MATERIALS DESIGN SOFTWARE VERSION 4.3
 NORTH AMERICAN GREEN CHANNEL PROTECTION - ENGLISH/S.I.
 USER SPECIFIED CHANNEL LINING BACK-UP COMPUTATIONS

PROJECT NAME: PROJECT NO.:
 COMPUTED BY: DATE: 6/19/2009
 FROM STATION/REACH: TO STATION/REACH:
 DRAINAGE AREA: DESIGN FREQUENCY:

 INPUT PARAMETERS

Channel Discharge : 8.4 cfs (.24 m³/s)
 Peak Flow Period : 24 hours
 Channel Slope : 0.235 ft/ft (0.235 m/m)
 Channel Bottom Width : 3.0 ft (.91 m)
 Left Side Slope : 2:1
 Right Side Slope : 2:1

Channel Lining : C350 Staple E Mix 75-95%
 Permi. Shear(Tp) :10.00 psf (478.8 Pa)
 Phase = 3
 Class = C Vegetation
 Soil = Silt Loam
 Allowable Soil Shear(Ta):1.2 psf (57.4560022830963 Pa)

 CALCULATIONS

Initial Depth Estimate = $0.16 * (8.4 / (0.235^{0.5}))^{0.375} = 0.47 \text{ ft } (.14 \text{ m})$
 Final Channel Depth (after 8 iterations) = .42 ft (0.13 m)
 Flow Area = $(3.0 * 0.4) + (0.5 * 0.42^2 * (2.0 + 2.0)) = 1.6 \text{ sq.ft } (0.1 \text{ m}^2)$
 Wet Per. = $3.0 + (0.4 * (((2.0^2) + 1)^{.5} + ((2.0^2) + 1)^{.5})) = 4.9 \text{ ft } (1.5 \text{ m})$
 Hydraulic Radius = $(1.6 / 4.9) = 0.3 \text{ ft } (0.1 \text{ m})$
 Channel Velocity = $(1.486 / 0.065) * (0.3^{0.667}) * (0.235^{.5}) = 5.2 \text{ fps } (1.6 \text{ m/s})$

Channel Effective Manning's Roughness = 0.065
 Calculated Shear (Td) = $62.4 * 0.42 * 0.235 = 6.12 \text{ psf } (293.0 \text{ Pa})$
 Safety Factor = $(Tp / Td) = (10.00 / 6.12) = 1.63$

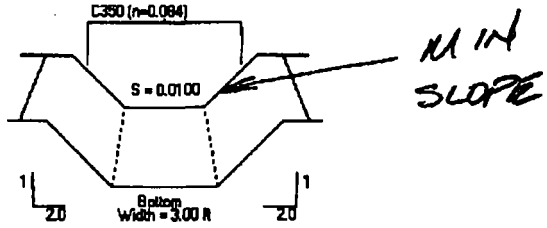
Effective Stress on Blanket(Te) = $6.1 * (1 - 0.75) / (0.065)^2 = 0.60 \text{ psf } (28.8 \text{ Pa})$

North American Green - ECMD5 Version 4.3
 PROJECT NAME: PROJECT NO.:
 FROM STATION/REACH: TO STATION/REACH: DRAINAGE AREA: DESIGN FREQUENCY:

HYDRAULIC RESULTS

Discharge (cfs)	Peak Flow Period (hrs)	Velocity (fps)	Area (sq. ft)	Hydraulic Radius (ft)	Normal Depth (ft)
8.4	24.0	1.44	5.84	0.73	1.12

$1.12 + 0.5 = 1.62 > 2.0 \checkmark$
 $1.12 (12) = 13.44 > 3.0 \checkmark$



LINEAR RESULTS

Not to Scale

Reach	Mating Type	Stability Analysis	Vegetation Characteristics				Permissible Shear Stress (psf)	Calculated Shear Stress (psf)	Safety Factor	Remarks
	Staple Pattern		Phase	Class	Type	Density				
Straight	C350	Vegetation	3	C	Mix	75-85%	10.00	0.70	14.36	STABLE
	Staple E	Soil	Silt Loam				1.200	0.021	57.26	STABLE

ICT-1



NORTH AMERICAN GREEN EROSION CONTROL MATERIALS DESIGN SOFTWARE VERSION 4.3
NORTH AMERICAN GREEN CHANNEL PROTECTION - ENGLISH/S.I.
USER SPECIFIED CHANNEL LINING BACK-UP COMPUTATIONS

PROJECT NAME: PROJECT NO.:
COMPUTED BY: DATE: 6/19/2009
FROM STATION/REACH: TO STATION/REACH:
DRAINAGE AREA: DESIGN FREQUENCY:

INPUT PARAMETERS

Channel Discharge : 8.4 cfs (.24 m³/s)
Peak Flow Period : 24 hours
Channel Slope : 0.01 ft/ft (0.01 m/m)
Channel Bottom Width : 3.0 ft (.91 m)
Left Side Slope : 2:1
Right Side Slope : 2:1

Channel Lining : C350 Staple E Mix 75-95%
Permi. Shear(Tp) : 10.00 psf (478.8 Pa)
Phase = 3
Class = C Vegetation
Soil = Silt Loam
Allowable Soil Shear(Ta) : 1.2 psf (57.4560022830963 Pa)

CALCULATIONS

Initial Depth Estimate = $0.16 * (8.4 / (0.010^{0.5}))^{0.375} = 0.84 \text{ ft } (.26 \text{ m})$
Final Channel Depth (after 7 iterations) = 1.12 ft (0.34 m)
Flow Area = $(3.0 * 1.1) + (0.5 * 1.12^2 * (2.0 + 2.0)) = 5.8 \text{ sq.ft } (0.5 \text{ m}^2)$
Wet Per. = $3.0 + (1.1 * (((2.0^2) + 1)^{.5} + ((2.0^2) + 1)^{.5})) = 8.0 \text{ ft } (2.4 \text{ m})$
Hydraulic Radius = $(5.8 / 8.0) = 0.7 \text{ ft } (0.2 \text{ m})$
Channel Velocity = $(1.486 / 0.084) * (0.7^{0.667}) * (0.010^{.5}) = 1.4 \text{ fps } (0.4 \text{ m/s})$

Channel Effective Manning's Roughness = 0.084
Calculated Shear (Td) = $62.4 * 1.12 * 0.010 = 0.70 \text{ psf } (33.4 \text{ Pa})$
Safety Factor = $(Tp / Td) = (10.00 / 0.70) = 14.36$

Effective Stress on Blanket(Te) = $0.7 * (1 - 0.75) / (0.084)^2 = 0.02 \text{ psf } (1.0 \text{ Pa})$

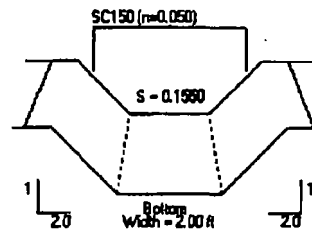
North American Green - ECMD5 Version 4.3		5/19/2009 09:50 AM COMPILED BY:	
PROJECT NAME:		PROJECT NO.:	
FROM STATION/REACH:	TO STATION/REACH:	DRAINAGE AREA:	DESIGN FREQUENCY:

HYDRAULIC RESULTS

Discharge (cfs)	Peak Flow Period (hrs)	Velocity (fps)	Area (sq.ft)	Hydraulic Radius (ft)	Normal Depth (ft)
0.9	24.0	2.95	0.32	0.12	0.14

$$0.14 + 0.5 = 0.64 < 1.0 \checkmark$$

$$0.14(12) = 1.7 \sim 2 \checkmark$$



LINER RESULTS

Not to Scale

Reach	Mating Type	Stability Analysis	Vegetation Characteristics				Permissible Shear Stress (psf)	Calculated Shear Stress (psf)	Safety Factor	Remarks
	Staple Pattern		Phase	Class	Type	Density				
Straight	SC150	Unvegetated					2.00	1.34	1.49	STABLE
	Staple D									

ICF-2

$$Q = CIA$$

$$C = 0.5$$

$$I = 6.0 \text{ in/hr}$$

$$A = 0.3 \text{ AC}$$

$$Q = 0.9 \text{ CFS}$$



 NORTH AMERICAN GREEN EROSION CONTROL MATERIALS DESIGN SOFTWARE VERSION 4.3
 NORTH AMERICAN GREEN CHANNEL PROTECTION - ENGLISH/S.I.
 USER SPECIFIED CHANNEL LINING BACK-UP COMPUTATIONS

PROJECT NAME: PROJECT NO.:
 COMPUTED BY: DATE: 6/19/2009
 FROM STATION/REACH: TO STATION/REACH:
 DRAINAGE AREA: DESIGN FREQUENCY:

 INPUT PARAMETERS

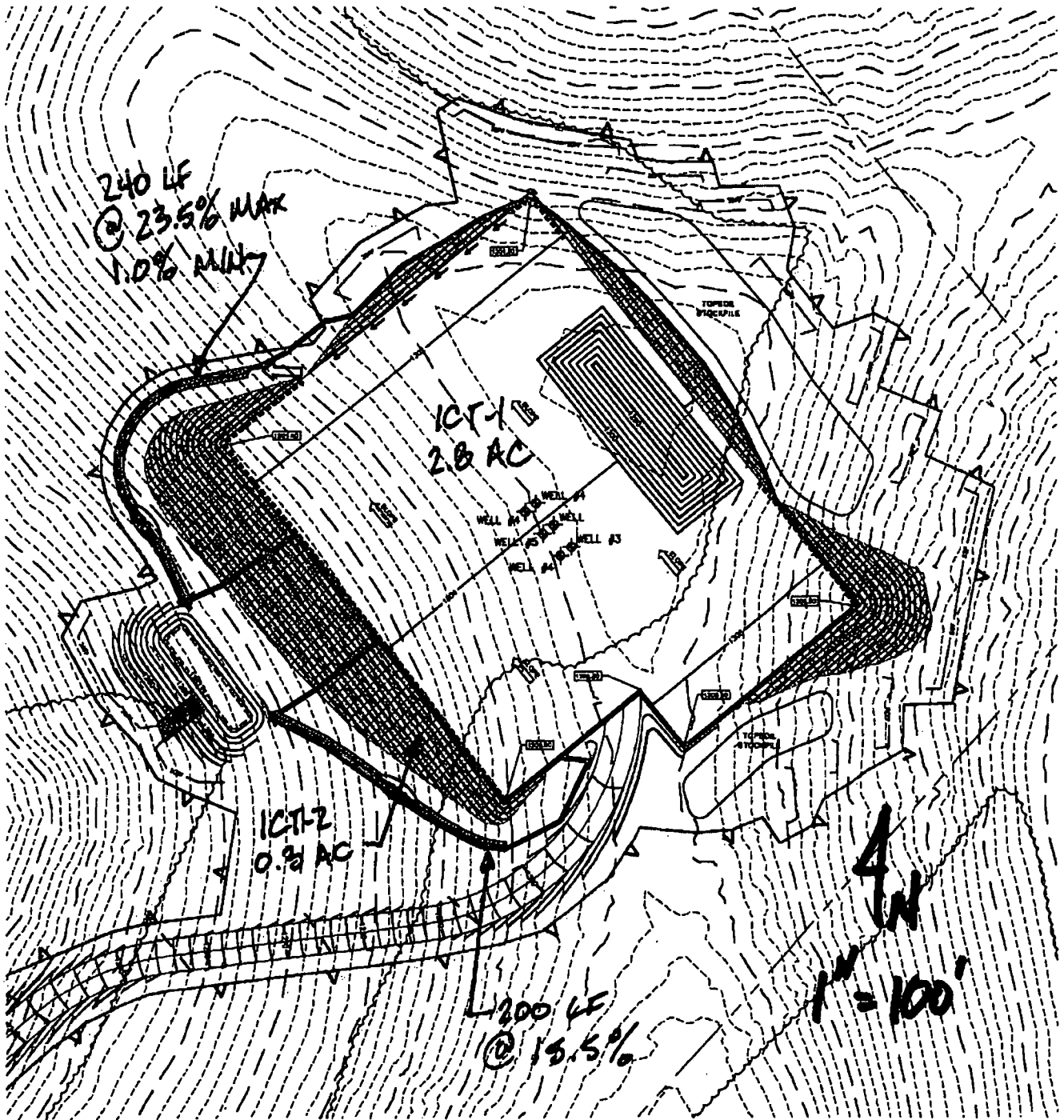
Channel Discharge : .9 cfs (.03 m³/s)
 Peak Flow Period : 24 hours
 Channel Slope : 0.155 ft/ft (0.155 m/m)
 Channel Bottom Width : 2.0 ft (.61 m)
 Left Side Slope : 2:1
 Right Side Slope : 2:1

Channel Lining : SC150 Staple D
 Permi. Shear(Tp) :2.00 psf (95.8 Pa)
 Phase = 0

 CALCULATIONS

Initial Depth Estimate = $0.16 * (0.9 / (0.155^{0.5}))^{0.375} = 0.22 \text{ ft } (.07 \text{ m})$
 Final Channel Depth (after 8 iterations) = .14 ft (0.04 m)
 Flow Area = $(2.0 * 0.1) + (0.5 * 0.14^2 * (2.0 + 2.0)) = 0.3 \text{ sq.ft } (0.0 \text{ m}^2)$
 Wet Per. = $2.0 + (0.1 * (((2.0^2) + 1)^{.5} + ((2.0^2) + 1)^{.5})) = 2.6 \text{ ft } (0.8 \text{ m})$
 Hydraulic Radius = $(0.3 / 2.6) = 0.1 \text{ ft } (0.0 \text{ m})$
 Channel Velocity = $(1.486 / 0.050) * (0.1^{0.667}) * (0.155^{.5}) = 2.9 \text{ fps } (0.9 \text{ m/s})$

Channel Effective Manning's Roughness = 0.050
 Calculated Shear (Td) = $62.4 * 0.14 * 0.155 = 1.34 \text{ psf } (64.2 \text{ Pa})$
 Safety Factor = $(Tp / Td) = (2.00 / 1.34) = 1.49$



North American Green - EOMDS Version 4.3

9/15/2009 11:04 AM COMPUTED BY:

PROJECT NAME:

PROJECT NO.:

FROM STATION/REACH:

TO STATION/REACH:

DRAINAGE AREA:

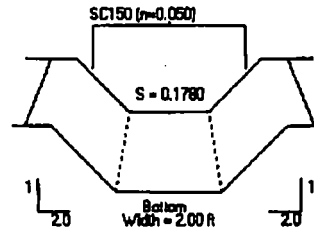
DESIGN FREQUENCY:

HYDRAULIC RESULTS

Discharge (cfs)	Peak Flow Period (hrs)	Velocity (fps)	Area (sq ft)	Hydraulic Radius (ft)	Normal Depth (ft)
1.3	0.1	3.39	0.38	0.14	0.16

$$0.16 + 0.5 = 0.66 < 1.0 \checkmark$$

$$0.16(12) = 1.9 \sim 2.0 \checkmark$$



LINER RESULTS

Not to Scale

Reach	Mating Type	Stability Analysis	Vegetation Characteristics				Permissible Shear Stress (psf)	Calculated Shear Stress (psf)	Safety Factor	Remarks
	Staple Pattern		Phase	Class	Type	Density				
Straight	SC150	Unvegetated					2.00	1.83	1.09	STABLE
	Staple D									

ICT-4

$$A = 0.6 \text{ AC}$$

$$Q = 1.26 \text{ CFS}$$

$$Q = CIA$$

$$C = 0.3$$

$$I = 17.0 \text{ IN/HR}$$

10/15/2009

 NORTH AMERICAN GREEN EROSION CONTROL MATERIALS DESIGN SOFTWARE VERSION 4.3
 NORTH AMERICAN GREEN CHANNEL PROTECTION - ENGLISH/S.I.
 USER SPECIFIED CHANNEL LINING BACK-UP COMPUTATIONS

PROJECT NAME: PROJECT NO.:
 COMPUTED BY: DATE: 9/16/2009
 FROM STATION/REACH: TO STATION/REACH:
 RAINAGE AREA: DESIGN FREQUENCY:

 INPUT PARAMETERS

Channel Discharge : 1.3 cfs (.04 m³/s)
 Peak Flow Period : 0.1 hours
 Channel Slope : 0.178 ft/ft (0.178 m/m)
 Channel Bottom Width : 2.0 ft (.61 m)
 Left Side Slope : 2:1
 Right Side Slope : 2:1

Channel Lining : SC150 Staple D
 Term. Shear(Tp) : 2.00 psf (95.8 Pa)
 Phase = 0

 CALCULATIONS

Initial Depth Estimate = $0.16 * (1.3 / (0.178^{0.5}))^{0.375} = 0.24 \text{ ft } (.07 \text{ m})$
 Final Channel Depth (after 8 iterations) = .16 ft (0.05 m)
 Flow Area = $(2.0 * 0.2) + (0.5 * 0.16^2 * (2.0 + 2.0)) = 0.4 \text{ sq.ft } (0.0 \text{ m}^2)$
 Wet Per. = $2.0 + (0.2 * (((2.0^2) + 1)^{.5} + ((2.0^2) + 1)^{.5})) = 2.7 \text{ ft } (0.8 \text{ m})$
 Hydraulic Radius = $(0.4 / 2.7) = 0.1 \text{ ft } (0.0 \text{ m})$
 Channel Velocity = $(1.486 / 0.050) * (0.1^{0.667}) * (0.178^{.5}) = 3.4 \text{ fps } (1.0 \text{ m/s})$
 Channel Effective Manning's Roughness = 0.050
 Calculated Shear (Td) = $62.4 * 0.16 * 0.178 = 1.83 \text{ psf } (87.7 \text{ Pa})$
 Safety Factor = $(Tp / Td) = (2.00 / 1.83) = 1.09$

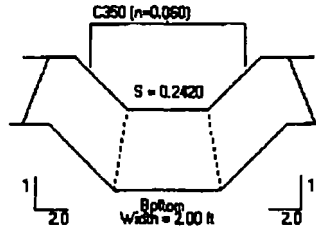
North American Green - ECOMS Version 4.3
 PROJECT NAME: S/16/2008 10:49 AM COMPUTED BY:
 FROM STATION/REACH: PROJECT NO.:
 TO STATION/REACH: DRAINAGE AREA: DESIGN FREQUENCY:

HYDRAULIC RESULTS

Discharge (cfs)	Peak Flow Period (hrs)	Velocity (fps)	Area (sq.ft)	Hydraulic Radius (ft)	Normal Depth (ft)
8.8	0.1	6.00	1.47	0.36	0.49

$$0.49 + 0.5 = 0.99 < 1.5 \checkmark$$

$$0.49(12) = 5.9 > 2.0 \checkmark$$



LINER RESULTS

Not to Scale

Reach	Matting Type	Stability Analysis	Vegetation Characteristics				Permissible Shear Stress (psf)	Calculated Shear Stress (psf)	Safety Factor	Remarks
	Staple Pattern		Phase	Class	Type	Density				
Straight	C350	Vegetation	3	C	Mix	75-95%	12.00	7.42	1.62	STABLE
	Staple E	Soil	Silt Loam				1.200	0.654	1.40	STABLE

ICT-5

A = 4.2 AC

Q = 8.82 CFS



 NORTH AMERICAN GREEN EROSION CONTROL MATERIALS DESIGN SOFTWARE VERSION 4.3
 NORTH AMERICAN GREEN CHANNEL PROTECTION - ENGLISH/S.I.
 USER SPECIFIED CHANNEL LINING BACK-UP COMPUTATIONS

PROJECT NAME: PROJECT NO.:
 COMPUTED BY: DATE: 9/16/2009
 FROM STATION/REACH: TO STATION/REACH:
 DRAINAGE AREA: DESIGN FREQUENCY:

 INPUT PARAMETERS

Channel Discharge : 8.8 cfs (.25 m³/s)
 Peak Flow Period : 0.1 hours
 Channel Slope : 0.242 ft/ft (0.242 m/m)
 Channel Bottom Width : 2.0 ft (.61 m)
 Left Side Slope : 2:1
 Right Side Slope : 2:1

Channel Lining : C350 Staple E Mix 75-95%
 Permi. Shear(Tp) : 12.00 psf (574.6 Pa)
 Phase = 3
 Class = C Vegetation
 Soil = Silt Loam
 Allowable Soil Shear(Ta): 1.2 psf (57.4560022830963 Pa)

 CALCULATIONS

Initial Depth Estimate = $0.16 * (8.8 / (0.242^{0.5}))^{0.375} = 0.47 \text{ ft } (.14 \text{ m})$
 Final Channel Depth (after 9 iterations) = .49 ft (0.15 m)
 Flow Area = $(2.0 * 0.5) + (0.5 * 0.49^2 * (2.0 + 2.0)) = 1.5 \text{ sq.ft } (0.1 \text{ m}^2)$
 Wet Per. = $2.0 + (0.5 * (((2.0^2) + 1)^{1.5} + ((2.0^2) + 1)^{1.5})) = 4.2 \text{ ft } (1.3 \text{ m})$
 Hydraulic Radius = $(1.5 / 4.2) = 0.3 \text{ ft } (0.1 \text{ m})$
 Channel Velocity = $(1.486 / 0.060) * (0.3^{0.667}) * (0.242^{.5}) = 6.0 \text{ fps } (1.8 \text{ m/s})$

Channel Effective Manning's Roughness = 0.060
 Calculated Shear (Td) = $62.4 * 0.49 * 0.242 = 7.42 \text{ psf } (355.5 \text{ Pa})$
 Safety Factor = $(Tp / Td) = (12.00 / 7.42) = 1.62$

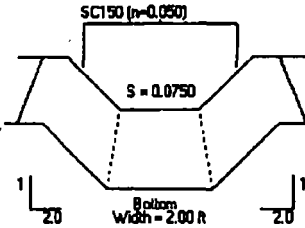
Effective Stress on Blanket(Te) = $7.4 * (1 - 0.75) / (0.060)^2 = 0.85 \text{ psf } (40.9 \text{ Pa})$

$$\text{Safety Factor} = (T_a/T_e) = (1.20 / 0.854) = 1.40$$

North American Green - ECNDS Version 4.3		9/16/2009 10:49 AM		COMPUTED BY:	
PROJECT NAME:		PROJECT NO.:			
FROM STATION/REACH:		TO STATION/REACH:		DRAINAGE AREA:	
				DESIGN FREQUENCY:	

HYDRAULIC RESULTS

Discharge (cfs)	Peak Flow Period (hrs)	Velocity (fps)	Area (sq.ft)	Hydraulic Radius (ft)	Normal Depth (ft)
0.6	0.1	1.96	0.31	0.12	0.14



$$0.14 + 0.5 = 0.64 < 1.0 \checkmark$$

$$0.14(12) = 1.7 \sim 2.0 \checkmark$$

LINER RESULTS

Not to Scale

Reach	Mating Type	Stability Analysis	Vegetation Characteristics				Permissible Shear Stress (psf)	Calculated Shear Stress (psf)	Safety Factor	Remarks
	Staple Pattern		Phase	Class	Type	Density				
Straight	SC160	Unvegetated					2.00	0.63	3.16	STABLE
	Staple D									

ICT-6

A = 0.3 AC

Q = 0.63 CFS



 NORTH AMERICAN GREEN EROSION CONTROL MATERIALS DESIGN SOFTWARE VERSION 4.3
 NORTH AMERICAN GREEN CHANNEL PROTECTION - ENGLISH/S.I.
 USER SPECIFIED CHANNEL LINING BACK-UP COMPUTATIONS

PROJECT NAME: PROJECT NO.:
 COMPUTED BY: DATE: 9/16/2009
 FROM STATION/REACH: TO STATION/REACH:
 DRAINAGE AREA: DESIGN FREQUENCY:

 INPUT PARAMETERS

Channel Discharge : .6 cfs (.02 m³/s)
 Peak Flow Period : 0.1 hours
 Channel Slope : 0.075 ft/ft (0.075 m/m)
 Channel Bottom Width : 2.0 ft (.61 m)
 Left Side Slope : 2:1
 Right Side Slope : 2:1

Channel Lining : SC150 Staple D
 Permi. Shear(Tp) :2.00 psf (95.8 Pa)
 Phase = 0

 CALCULATIONS

Initial Depth Estimate = $0.16 * (0.6 / (0.075^{0.5}))^{0.375} = 0.21 \text{ ft } (.07 \text{ m})$
 Final Channel Depth (after 8 iterations) = .14 ft (0.04 m)
 Flow Area = $(2.0 * 0.1) + (0.5 * 0.14^2 * (2.0 + 2.0)) = 0.3 \text{ sq.ft } (0.0 \text{ m}^2)$
 Wet Per. = $2.0 + (0.1 * (((2.0^2) + 1)^{.5} + ((2.0^2) + 1)^{.5})) = 2.6 \text{ ft } (0.8 \text{ m})$
 Hydraulic Radius = $(0.3 / 2.6) = 0.1 \text{ ft } (0.0 \text{ m})$
 Channel Velocity = $(1.486 / 0.050) * (0.1^{0.667}) * (0.075^{.5}) = 2.0 \text{ fps } (0.6 \text{ m/s})$

Channel Effective Manning's Roughness = 0.050
 Calculated Shear (Td) = $62.4 * 0.14 * 0.075 = 0.63 \text{ psf } (30.3 \text{ Pa})$
 Safety Factor = $(Tp/Td) = (2.00 / 0.63) = 3.16$

North American Green - ECMS Version 4.3

9/16/2008 10:50 AM COMPUTED BY:

PROJECT NAME:

PROJECT NO.:

FROM STATION/REACH:

TO STATION/REACH:

DRAINAGE AREA:

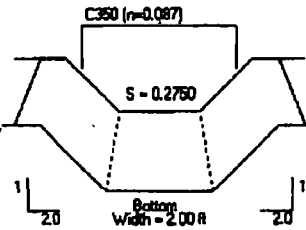
DESIGN FREQUENCY:

HYDRAULIC RESULTS

Discharge (cfs)	Peak Flow Period (hrs)	Velocity (fps)	Area (sq.ft)	Hydraulic Radius (ft)	Normal Depth (ft)
3.2	0.1	3.61	0.89	0.25	0.33

$$0.33 + 0.5 = 0.83 < 1.5 \checkmark$$

$$0.33(12) = 4.0 > 2.0 \checkmark$$

**LINER RESULTS**

Not to Scale

Reach	Matting Type	Stability Analysis	Vegetation Characteristics				Permissible Shear Stress (psf)	Calculated Shear Stress (psf)	Safety Factor	Remarks
	Staple Pattern		Phase	Class	Type	Density				
Straight	C350	Vegetation	3	C	Mix	75-95%	12.00	5.71	2.10	STABLE
	Staple E	Soil			Silt Loam		1.200	0.319	3.76	STABLE

1CT-7

A = 1.5 AC

Q = 3.15 CFS



 NORTH AMERICAN GREEN EROSION CONTROL MATERIALS DESIGN SOFTWARE VERSION 4.3
 NORTH AMERICAN GREEN CHANNEL PROTECTION - ENGLISH/S.I.
 USER SPECIFIED CHANNEL LINING BACK-UP COMPUTATIONS

PROJECT NAME: PROJECT NO.:
 COMPUTED BY: DATE: 9/16/2009
 FROM STATION/REACH: TO STATION/REACH:
 DRAINAGE AREA: DESIGN FREQUENCY:

 INPUT PARAMETERS

Channel Discharge : 3.2 cfs (.09 m³/s)
 Peak Flow Period : 0.1 hours
 Channel Slope : 0.275 ft/ft (0.275 m/m)
 Channel Bottom Width : 2.0 ft (.61 m)
 Left Side Slope : 2:1
 Right Side Slope : 2:1

Channel Lining : C350 Staple E Mix 75-85%
 Permi. Shear(Tp) : 12.00 psf (574.6 Pa)
 Phase = 3
 Class = C Vegetation
 Soil = Silt Loam
 Allowable Soil Shear(Ta): 1.2 psf (57.4560022830963 Pa)

 CALCULATIONS

Initial Depth Estimate = $0.16 * (3.2 / (0.275^{0.5}))^{0.375} = 0.32 \text{ ft } (.10 \text{ m})$
 Final Channel Depth (after 6 iterations) = .33 ft (0.10 m)
 Flow Area = $(2.0 * 0.3) + (0.5 * 0.33^2 * (2.0 + 2.0)) = 0.9 \text{ sq.ft } (0.1 \text{ m}^2)$
 Wet Per. = $2.0 + (0.3 * (((2.0^2) + 1)^{1.5} + ((2.0^2) + 1)^{1.5})) = 3.5 \text{ ft } (1.1 \text{ m})$
 Hydraulic Radius = $(0.9 / 3.5) = 0.3 \text{ ft } (0.1 \text{ m})$
 Channel Velocity = $(1.486 / 0.087) * (0.3^{0.667}) * (0.275^{0.5}) = 3.6 \text{ fps } (1.1 \text{ m/s})$

Channel Effective Manning's Roughness = 0.087
 Calculated Shear (Td) = $62.4 * 0.33 * 0.275 = 5.71 \text{ psf } (273.4 \text{ Pa})$
 Safety Factor = $(Tp / Td) = (12.00 / 5.71) = 2.10$

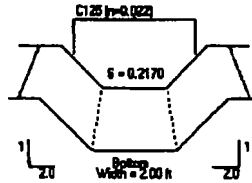
Effective Stress on Blanket(Te) = $5.7 * (1 - 0.75) / (0.087)^2 = 0.32 \text{ psf } (15.3 \text{ Pa})$

$$\text{Safety Factor} = (T_a/T_e) = (1.20 / 0.319) = 3.76$$

North American Green - ECOMS Version 4.3 11/18/2010 08:33 PM COMPILED BY:
 PROJECT NAME: PROJECT NO.:
 FROM STATION/REACH: TO STATION/REACH: DRAINAGE AREA: DESIGN FREQUENCY:

HYDRAULIC RESULTS

Discharge (cfs)	Peak Flow Period (yrs)	Velocity (fps)	Area (sq ft)	Hydraulic Radius (ft)	Normal Depth (ft)
1.9	0.1	7.05	0.27	0.11	0.12



$$0.12 + 0.5 = 0.62 < 1.0$$

$$0.12 (f2) = 1.4 \sim 2$$

LNER RESULTS

Not to Scale

Reach	Channel Type	Stability Analysis	Vegetation Characteristics				Permissible Shear Stress (psf)	Calculated Shear Stress (psf)	Safety Factor	Remarks
	Stable Pattern		Phase	Class	Type	Density				
Straight	C125	Unvegetated					2.25	1.53	1.38	STABLE
	Stable D									

ICT-3

A = 0.9 AC

Q = 1.9 CFS

11/18/2010 08:33 PM

 NORTH AMERICAN GREEN EROSION CONTROL MATERIALS DESIGN SOFTWARE VERSION 4.3
 NORTH AMERICAN GREEN CHANNEL PROTECTION - ENGLISH/S.I.
 USER SPECIFIED CHANNEL LINING BACK-UP COMPUTATIONS

PROJECT NAME:	PROJECT NO.:
COMPUTED BY:	DATE: 1/18/2010
FROM STATION/REACH:	TO STATION/REACH:
DRAINAGE AREA:	DESIGN FREQUENCY:

 INPUT PARAMETERS

Channel Discharge : 1.9 cfs (.05 m³/s)
 Peak Flow Period : 0.1 hours
 Channel Slope : 0.217 ft/ft (0.217 m/m)
 Channel Bottom Width : 2.0 ft (.61 m)
 Left Side Slope : 2:1
 Right Side Slope : 2:1

Channel Lining : C125 Staple D
 Perml. Shear(Tp) : 2.25 psf (107.7 Pa)
 Phase = 0

 CALCULATIONS

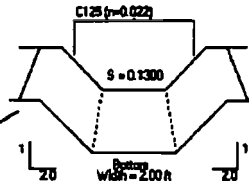
Initial Depth Estimate = $0.16 * (1.9 / (0.217^{0.5}))^{0.375} = 0.27 \text{ ft } (.08 \text{ m})$
 Final Channel Depth (after 10 iterations) = .12 ft (0.04 m)
 Flow Area = $(2.0 * 0.1) + (0.5 * 0.12^2 * (2.0 + 2.0)) = 0.3 \text{ sq.ft } (0.0 \text{ m}^2)$
 Wet Per. = $2.0 + (0.1 * (((2.0^2) + 1)^{.5} + ((2.0^2) + 1)^{.5})) = 2.5 \text{ ft } (0.8 \text{ m})$
 Hydraulic Radius = $(0.3 / 2.5) = 0.1 \text{ ft } (0.0 \text{ m})$
 Channel Velocity = $(1.486 / 0.022) * (0.1^{0.667}) * (0.217^{.5}) = 7.1 \text{ fps } (2.1 \text{ m/s})$

Channel Effective Manning's Roughness = 0.022
 Calculated Shear (Td) = $62.4 * 0.12 * 0.217 = 1.63 \text{ psf } (77.9 \text{ Pa})$
 Safety Factor = $(Tp / Td) = (2.25 / 1.63) = 1.38$

North American Erosion - ECHS Version 4.3		1/18/2010 10:33 PM	COMPUTED BY:
PROJECT NAME:		PROJECT NO.:	
FROM STATION/REACH:		DRAINAGE AREA:	
TO STATION/REACH:		DESIGN FREQUENCY:	

HYDRAULIC RESULTS

Discharge (cfs)	Peak Flow Period (hrs)	Velocity (ft/s)	Area (sq ft)	Hydraulic Radius (ft)	Normal Depth (ft)
2.3	0.1	8.27	0.36	0.13	0.16



$$0.16 + 0.5 = 0.66 < 1.0 \checkmark$$

$$0.16(12) = 1.9 \sim 2 \checkmark$$

LINEAR RESULTS

Not to Scale

Reach	Mating Type	Stability Analysis	Vegetation Characteristics				Permissible Shear Stress (psf)	Calculated Shear Stress (psf)	Safety Factor	Remarks
	Stable Pattern		Phase	Class	Type	Density				
Straight	C125	Unvegetated					2.25	1.27	1.78	STABLE
	Scalps D									

1CT-B

A = 1.1 AC

Q = 2.3 CFS

 NORTH AMERICAN GREEN EROSION CONTROL MATERIALS DESIGN SOFTWARE VERSION 4.3
 NORTH AMERICAN GREEN CHANNEL PROTECTION - ENGLISH/S.I.
 USER SPECIFIED CHANNEL LINING BACK-UP COMPUTATIONS

PROJECT NAME:	PROJECT NO.:
COMPUTED BY:	DATE: 1/18/2010
FROM STATION/REACH:	TO STATION/REACH:
DRAINAGE AREA:	DESIGN FREQUENCY:

 INPUT PARAMETERS

Channel Discharge : 2.3 cfs (.07 m³/s)
 Peak Flow Period : 0.1 hours
 Channel Slope : 0.13 ft/ft (0.13 m/m)
 Channel Bottom Width : 2.0 ft (.61 m)
 Left Side Slope : 2:1
 Right Side Slope : 2:1

Channel Lining : C125 Staple D
 Permi. Shear(Tp) : 2.25 psf (107.7 Pa)
 Phase = 0

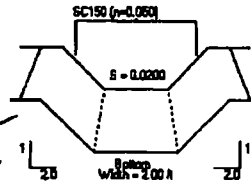
 CALCULATIONS

Initial Depth Estimate = $0.16 * (2.3 / (0.130^{0.5}))^{0.375} = 0.32 \text{ ft } (.10 \text{ m})$
 Final Channel Depth (after 9 iterations) = .16 ft (0.05 m)
 Flow Area = $(2.0 * 0.2) + (0.5 * 0.16^2 * (2.0 + 2.0)) = 0.4 \text{ sq.ft } (0.0 \text{ m}^2)$
 Wet Per. = $2.0 + (0.2 * (((2.0^2) + 1)^{.5} + ((2.0^2) + 1)^{.5})) = 2.7 \text{ ft } (0.8 \text{ m})$
 Hydraulic Radius = $(0.4 / 2.7) = 0.1 \text{ ft } (0.0 \text{ m})$
 Channel Velocity = $(1.486 / 0.022) * (0.1^{0.867}) * (0.130^{.5}) = 6.4 \text{ fps } (1.9 \text{ m/s})$
 Channel Effective Manning's Roughness = 0.022
 Calculated Shear (Td) = $62.4 * 0.16 * 0.130 = 1.27 \text{ psf } (60.6 \text{ Pa})$
 Safety Factor = $(Tp / Td) = (2.25 / 1.27) = 1.78$

North American Green - ECOMS Version 4.3 1/18/2010 08:34 PM COMPUTED BY:
 PROJECT NAME: PROJECT NO:
 FROM STATION/REACH: TO STATION/REACH: DRAINAGE AREA: DESIGN FREQUENCY:

HYDRAULIC RESULTS

Discharge (cfs)	Peak Flow Period (hrs)	Velocity (fps)	Area (sq ft)	Hydraulic Radius (ft)	Normal Depth (ft)
3.4	0.1	2.18	1.97	0.98	0.82



$$0.52 + 0.5 = 1.02 < 1.5$$

$$0.52(12) = 6.24 > 2.0$$

UNIFORM RESULTS

Not to Scale

Reach	Mating Type	Stability Analysis	Vegetation Characteristics				Permissible Shear Stress (psf)	Calculated Shear Stress (psf)	Safety Factor	Remarks
	Staple Pattern		Phase	Class	Type	Density				
Straight	SC150	Unvegetated					2.00	0.68	3.03	STABLE
	Staple D									

1CT-9

A = 1.6 AC

Q = 3.4 CFS

 NORTH AMERICAN GREEN EROSION CONTROL MATERIALS DESIGN SOFTWARE VERSION 4.3
 NORTH AMERICAN GREEN CHANNEL PROTECTION - ENGLISH/S.I.
 USER SPECIFIED CHANNEL LINING BACK-UP COMPUTATIONS

PROJECT NAME: PROJECT NO.:
 COMPUTED BY: DATE: 1/18/2010
 FROM STATION/REACH: TO STATION/REACH:
 DRAINAGE AREA: DESIGN FREQUENCY:

 INPUT PARAMETERS

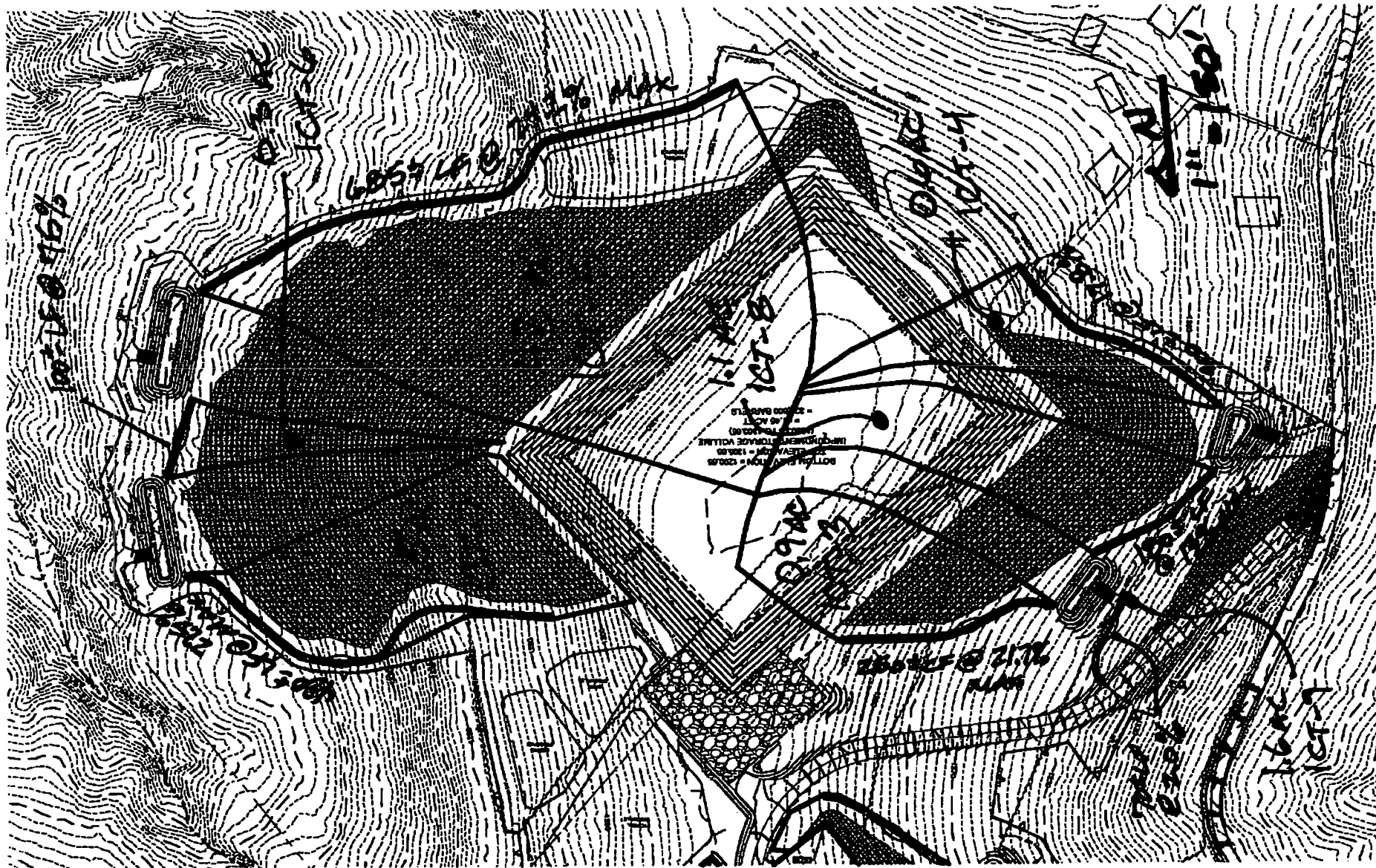
Channel Discharge : 3.4 cfs (.10 m³/s)
 Peak Flow Period : 0.1 hours
 Channel Slope : 0.02 ft/ft (0.02 m/m)
 Channel Bottom Width : 2.0 ft (.61 m)
 Left Side Slope : 2:1
 Right Side Slope : 2:1

Channel Lining : SC150 Staple D
 Permi. Shear(Tp) : 2.00 psf (95.8 Pa)
 Phase = 0

 CALCULATIONS

Initial Depth Estimate = $0.16 * (3.4 / (0.020^{0.5}))^{0.375} = 0.53 \text{ ft } (.16 \text{ m})$
 Final Channel Depth (after 6 iterations) = .52 ft (0.16 m)
 Flow Area = $(2.0 * 0.5) + (0.5 * 0.52^2 * (2.0 + 2.0)) = 1.6 \text{ sq.ft } (0.1 \text{ m}^2)$
 Wet Per. = $2.0 + (0.5 * (((2.0^2) + 1)^{.5} + ((2.0^2) + 1)^{.5})) = 4.3 \text{ ft } (1.3 \text{ m})$
 Hydraulic Radius = $(1.6 / 4.3) = 0.4 \text{ ft } (0.1 \text{ m})$
 Channel Velocity = $(1.486 / 0.050) * (0.4^{0.667}) * (0.020^{.5}) = 2.2 \text{ fps } (0.7 \text{ m/s})$

Channel Effective Manning's Roughness = 0.050
 Calculated Shear (Td) = $62.4 * 0.52 * 0.020 = 0.65 \text{ psf } (31.0 \text{ Pa})$
 Safety Factor = $(Tp / Td) = (2.00 / 0.65) = 3.09$



Appendix E

EROSION AND SEDIMENTATION CONTROL PLAN
STANDARD WORKSHEET #2
RECORD OF TRAINING AND EXPERIENCE
IN EROSION AND SEDIMENTATION CONTROL METHODS AND TECHNIQUES

NAME OF PLAN PREPARER: James J. Martin

FORMAL EDUCATION:

Pennsylvania State University
September 1996 - June 2001
Civil Engineering - BSCE

EMPLOYMENT HISTORY:

Current Employer: The Gateway Engineers Inc.
Telephone: (412) 921-4030

Former Employer: Greenhorne & O'Mara
Telephone: (410) 266-0066

RECENT EROSION AND SEDIMENTATION CONTROL PLANS PREPARED:

Name of Project: The Villages at Neville Park Stream Restoration
County: Allegheny
Municipality: Collier Township
Permit Number: PAG-2-00-02-05-087
Approving Agency: Allegheny County Conservation District

Name of Project: Longwood at Oakmont
County: Allegheny
Municipality: Borough of Plum
Permit Number: Adequacy Review
Approving Agency: Allegheny County Conservation District

Name of Project: Knepper Press, Clinton Commerce Park
County: Allegheny
Municipality: Findlay Township
Permit Number: PA-R10-A456-3
Approving Agency: Allegheny County Conservation District

Name of Project: Guardian Self Storage at Robinson Mall
County: Allegheny
Municipality: Robinson Township
Permit Number: PAG-2-00-02-07-041
Approving Agency: Allegheny County Conservation District

Name of Project: Scott Station Metro Office Park
County: Allegheny
Municipality: Moon Township
Permit Number: PAG-2-00-02-08-071
Approving Agency: Allegheny County Conservation District

Name of Project: Proposed GE Access Drive
County: Allegheny
Municipality: North Fayette Township
Permit Number: Adequacy Review
Approving Agency: Allegheny County Conservation District

YEAGER WELL PAD

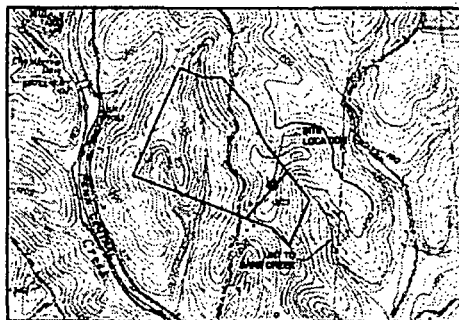
AMWELL TOWNSHIP
WASHINGTON COUNTY, PENNSYLVANIA

PREPARED FOR:
RANGE RESOURCES APPALACHIA, LLC
380 SOUTHPOINTE BLVD., SUITE 300
CANONSBURG, PA 15317

CALL BEFORE YOU DIG!
PENNSYLVANIA LAW ENFORCES
A PENNSYLVANIA STATE POLICE
CONSTRUCTION PROJECTS AND TO
OBTAIN A PERMIT TO DIG - STOP CALL
Pennsylvania One Call System, Inc.
1-800-242-1776
POCS Permit No.

CONSULTANTS

LIST OF UTILITIES



SITE LOCATION MAP
USGS AMITY QUAD

I am hereby certifying to the best of my knowledge, information and belief, that the Erosion and Sediment Control Plan and the Remediation Plan and Post Construction Stormwater Runoff Control, prepared herein, were prepared and made in accordance with the 2010 Pa. Code Chapter 102 and 103 of the Department of Environmental Protection. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

DWG No.	SHEET TITLE	INCLUDED
0000	COVER SHEET	☐
C130	OVERALL EROSION CONTROL PLAN	☐
C131	EROSION AND SEDIMENTATION CONTROL PLAN	☐
C132	EROSION AND SEDIMENTATION CONTROL PLAN	☐
C133	EROSION AND SEDIMENTATION CONTROL DETAILS	☐
C134	EROSION AND SEDIMENTATION CONTROL DETAILS	☐
C135	EROSION AND SEDIMENTATION CONTROL DETAILS	☐
C136	EROSION AND SEDIMENTATION CONTROL DETAILS	☐

LEGEND	CONTENTS	PROPOSED
1. TOP OF CLUMP	1. TOP OF CLUMP	1. TOP OF CLUMP
2. BUTTE	2. BUTTE	2. BUTTE
3. TOP OF HILL	3. TOP OF HILL	3. TOP OF HILL
4. BOTTOM OF HILL	4. BOTTOM OF HILL	4. BOTTOM OF HILL
5. TOP OF SLOPE	5. TOP OF SLOPE	5. TOP OF SLOPE
6. BOTTOM OF SLOPE	6. BOTTOM OF SLOPE	6. BOTTOM OF SLOPE
7. SLOPE	7. SLOPE	7. SLOPE
8. SLOPE	8. SLOPE	8. SLOPE
9. SLOPE	9. SLOPE	9. SLOPE
10. SLOPE	10. SLOPE	10. SLOPE
11. SLOPE	11. SLOPE	11. SLOPE
12. SLOPE	12. SLOPE	12. SLOPE
13. SLOPE	13. SLOPE	13. SLOPE
14. SLOPE	14. SLOPE	14. SLOPE
15. SLOPE	15. SLOPE	15. SLOPE
16. SLOPE	16. SLOPE	16. SLOPE
17. SLOPE	17. SLOPE	17. SLOPE
18. SLOPE	18. SLOPE	18. SLOPE
19. SLOPE	19. SLOPE	19. SLOPE
20. SLOPE	20. SLOPE	20. SLOPE
21. SLOPE	21. SLOPE	21. SLOPE
22. SLOPE	22. SLOPE	22. SLOPE
23. SLOPE	23. SLOPE	23. SLOPE
24. SLOPE	24. SLOPE	24. SLOPE
25. SLOPE	25. SLOPE	25. SLOPE
26. SLOPE	26. SLOPE	26. SLOPE
27. SLOPE	27. SLOPE	27. SLOPE
28. SLOPE	28. SLOPE	28. SLOPE
29. SLOPE	29. SLOPE	29. SLOPE
30. SLOPE	30. SLOPE	30. SLOPE
31. SLOPE	31. SLOPE	31. SLOPE
32. SLOPE	32. SLOPE	32. SLOPE
33. SLOPE	33. SLOPE	33. SLOPE
34. SLOPE	34. SLOPE	34. SLOPE
35. SLOPE	35. SLOPE	35. SLOPE
36. SLOPE	36. SLOPE	36. SLOPE
37. SLOPE	37. SLOPE	37. SLOPE
38. SLOPE	38. SLOPE	38. SLOPE
39. SLOPE	39. SLOPE	39. SLOPE
40. SLOPE	40. SLOPE	40. SLOPE
41. SLOPE	41. SLOPE	41. SLOPE
42. SLOPE	42. SLOPE	42. SLOPE
43. SLOPE	43. SLOPE	43. SLOPE
44. SLOPE	44. SLOPE	44. SLOPE
45. SLOPE	45. SLOPE	45. SLOPE
46. SLOPE	46. SLOPE	46. SLOPE
47. SLOPE	47. SLOPE	47. SLOPE
48. SLOPE	48. SLOPE	48. SLOPE
49. SLOPE	49. SLOPE	49. SLOPE
50. SLOPE	50. SLOPE	50. SLOPE
51. SLOPE	51. SLOPE	51. SLOPE
52. SLOPE	52. SLOPE	52. SLOPE
53. SLOPE	53. SLOPE	53. SLOPE
54. SLOPE	54. SLOPE	54. SLOPE
55. SLOPE	55. SLOPE	55. SLOPE
56. SLOPE	56. SLOPE	56. SLOPE
57. SLOPE	57. SLOPE	57. SLOPE
58. SLOPE	58. SLOPE	58. SLOPE
59. SLOPE	59. SLOPE	59. SLOPE
60. SLOPE	60. SLOPE	60. SLOPE
61. SLOPE	61. SLOPE	61. SLOPE
62. SLOPE	62. SLOPE	62. SLOPE
63. SLOPE	63. SLOPE	63. SLOPE
64. SLOPE	64. SLOPE	64. SLOPE
65. SLOPE	65. SLOPE	65. SLOPE
66. SLOPE	66. SLOPE	66. SLOPE
67. SLOPE	67. SLOPE	67. SLOPE
68. SLOPE	68. SLOPE	68. SLOPE
69. SLOPE	69. SLOPE	69. SLOPE
70. SLOPE	70. SLOPE	70. SLOPE
71. SLOPE	71. SLOPE	71. SLOPE
72. SLOPE	72. SLOPE	72. SLOPE
73. SLOPE	73. SLOPE	73. SLOPE
74. SLOPE	74. SLOPE	74. SLOPE
75. SLOPE	75. SLOPE	75. SLOPE
76. SLOPE	76. SLOPE	76. SLOPE
77. SLOPE	77. SLOPE	77. SLOPE
78. SLOPE	78. SLOPE	78. SLOPE
79. SLOPE	79. SLOPE	79. SLOPE
80. SLOPE	80. SLOPE	80. SLOPE
81. SLOPE	81. SLOPE	81. SLOPE
82. SLOPE	82. SLOPE	82. SLOPE
83. SLOPE	83. SLOPE	83. SLOPE
84. SLOPE	84. SLOPE	84. SLOPE
85. SLOPE	85. SLOPE	85. SLOPE
86. SLOPE	86. SLOPE	86. SLOPE
87. SLOPE	87. SLOPE	87. SLOPE
88. SLOPE	88. SLOPE	88. SLOPE
89. SLOPE	89. SLOPE	89. SLOPE
90. SLOPE	90. SLOPE	90. SLOPE
91. SLOPE	91. SLOPE	91. SLOPE
92. SLOPE	92. SLOPE	92. SLOPE
93. SLOPE	93. SLOPE	93. SLOPE
94. SLOPE	94. SLOPE	94. SLOPE
95. SLOPE	95. SLOPE	95. SLOPE
96. SLOPE	96. SLOPE	96. SLOPE
97. SLOPE	97. SLOPE	97. SLOPE
98. SLOPE	98. SLOPE	98. SLOPE
99. SLOPE	99. SLOPE	99. SLOPE
100. SLOPE	100. SLOPE	100. SLOPE

WATERSHED CLASSIFICATION: BANE CREEK (TSF)
RECEIVING STREAMS (USGS BLUE LINE): UNT TO BANE CREEK (TSF)
DISTANCE TO NEAREST USGS BLUE LINE STREAM: 80± FT
NO ANTICIPATED WETLAND IMPACTS

GATEWAY



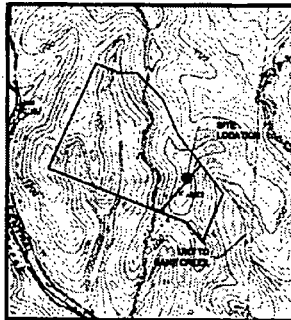
REVISION RECORD

YEAGER WELL PAD
AMWELL TOWNSHIP
WASHINGTON COUNTY, PENNSYLVANIA
RANGE RESOURCES APPALACHIA, LLC
380 SOUTHPOINTE BLVD., SUITE 300
CANONSBURG, PA 15317

COVER SHEET

C000

THIS PLAN IS FOR EROSION AND SEDIMENTATION CONTROL PURPOSES ONLY



SITE LOCATION MAP
USGS AMITY QUAD
NTS

NOTES:

1. This plan was prepared by the engineer for the purpose of showing the location of the proposed structures and the location of the structures on the site. It is not intended to be a final plan for construction. The engineer assumes no responsibility for the accuracy of the plan or the results of the construction. The engineer assumes no responsibility for the accuracy of the plan or the results of the construction.

2. As the construction of the plan is in progress, the engineer assumes no responsibility for the accuracy of the plan or the results of the construction. The engineer assumes no responsibility for the accuracy of the plan or the results of the construction.

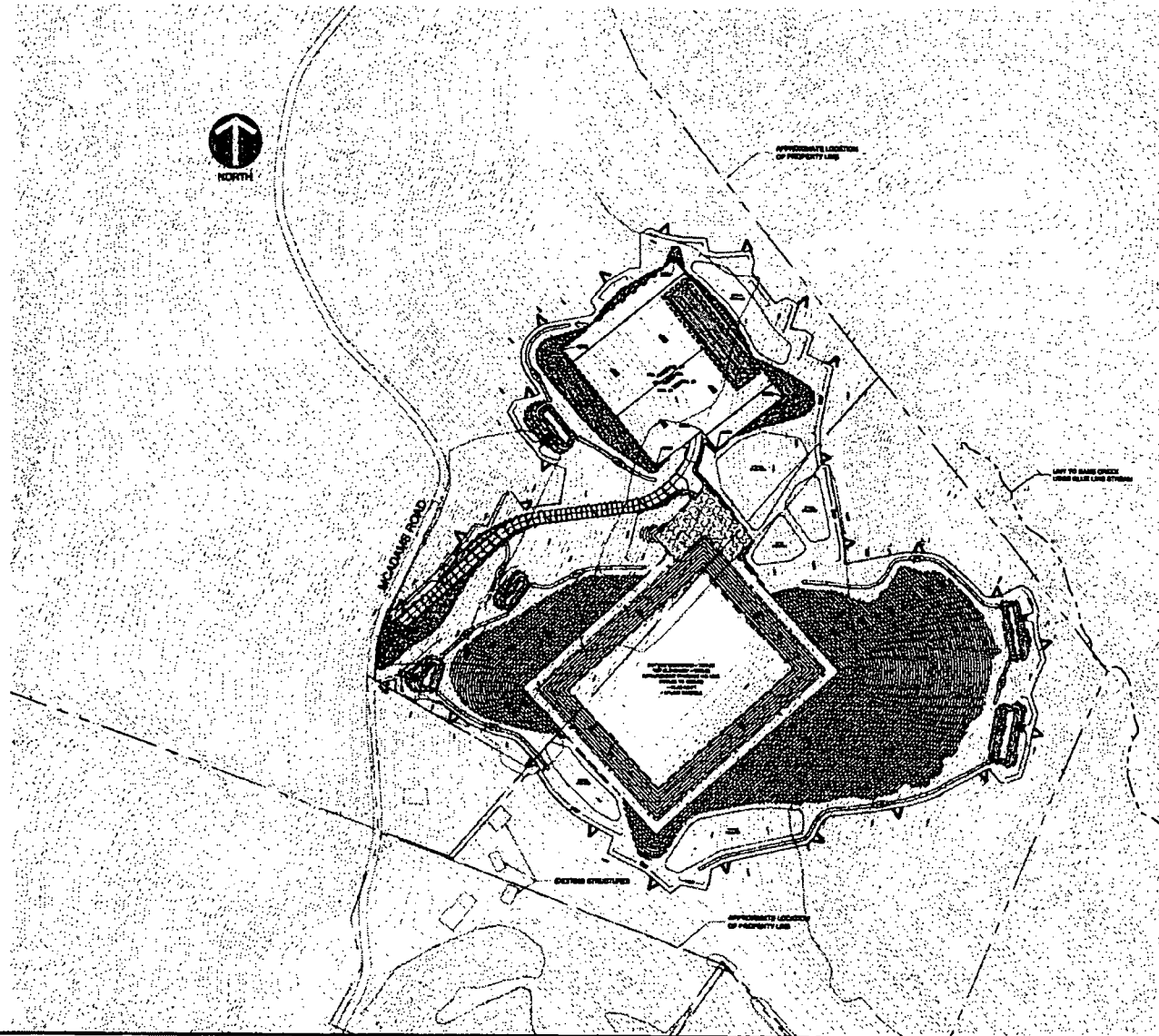


CALL BEFORE YOU DIG!
PENNSYLVANIA LAW REQUIRES
A PRELIMINARY DESIGN REVIEW FOR
CONSTRUCTION OF ALL NEW OR
EXISTING STRUCTURES AND A PRELIMINARY
DESIGN REVIEW FOR ALL NEW OR
EXISTING STRUCTURES. FOR MORE
INFORMATION, CALL 1-800-242-1776
POC: 1-800-242-1776

TOTAL AREA = 25.0± ACRES
DISTURBED AREA = 25.0± ACRES

EROSION & SEDIMENTATION
CONTROL LEGEND

- LIMITS OF DISTURBANCE/PROJECT LIMIT
- REINFORCED FILTER FABRIC FENCE (OF 1/2")
- SUPER SALT FENCE
- ROCK CONSTRUCTION ENTRANCE
- EROSION CONTROL BLANKET/ STEEP SLOPE
NEEDS EROSION CONTROL (SEE SPECIFICATIONS)
TO BE USED IN HYDRO-SECTIONS OF SLOPES
WITH REDEMPTION
- ROCK FILTER
- OFF-ROAD/ON-ROAD CHANGES
- CHAIN/ROCK/DRUM
- TOP OF SLOPE BERM



GATEWAY
Engineering & Survey
1000 N. 10th St., Suite 100
P.O. Box 1000, Suite 100
Clemmons, NC 27229
Phone: (336) 897-1000, Fax: (336) 897-1001
www.gatewayinc.com

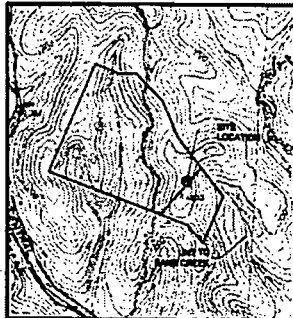


REVISION RECORD		
NO.	DATE	DESCRIPTION
1	01/15/2010	ISSUED FOR PERMIT
2	01/15/2010	ISSUED FOR PERMIT
3	01/15/2010	ISSUED FOR PERMIT
4	01/15/2010	ISSUED FOR PERMIT
5	01/15/2010	ISSUED FOR PERMIT
6	01/15/2010	ISSUED FOR PERMIT
7	01/15/2010	ISSUED FOR PERMIT
8	01/15/2010	ISSUED FOR PERMIT
9	01/15/2010	ISSUED FOR PERMIT
10	01/15/2010	ISSUED FOR PERMIT

YEAGER WELL PAD
AMITY, TOWNSHIP OF
AMITY, COUNTY OF, PENNSYLVANIA
RANGE RESOURCES APPALACHIA, LLC
300 SOUTHPOINTE BLVD., SUITE 100
CAMDEN, NJ 08107

GENERAL
EROSION CONTROL
PLAN
PROJECT NO. 1000
DATE: 01/15/2010
BY: [Signature]
CHECKED BY: [Signature]
C130

THIS PLAN IS FOR EROSION AND SEDIMENTATION CONTROL PURPOSES ONLY



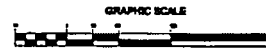
SITE LOCATION MAP
USGS AMITY QUAD
NTS

NOTES

1. THIS EROSION AND SEDIMENTATION CONTROL PLAN IS FOR EROSION AND SEDIMENTATION CONTROL PURPOSES ONLY. IT IS NOT A DESIGN OR CONSTRUCTION PLAN. IT IS THE RESPONSIBILITY OF THE USER TO OBTAIN ALL NECESSARY PERMITS AND TO FOLLOW ALL APPLICABLE REGULATIONS. THE USER SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND FOR FOLLOWING ALL APPLICABLE REGULATIONS. THE USER SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND FOR FOLLOWING ALL APPLICABLE REGULATIONS.

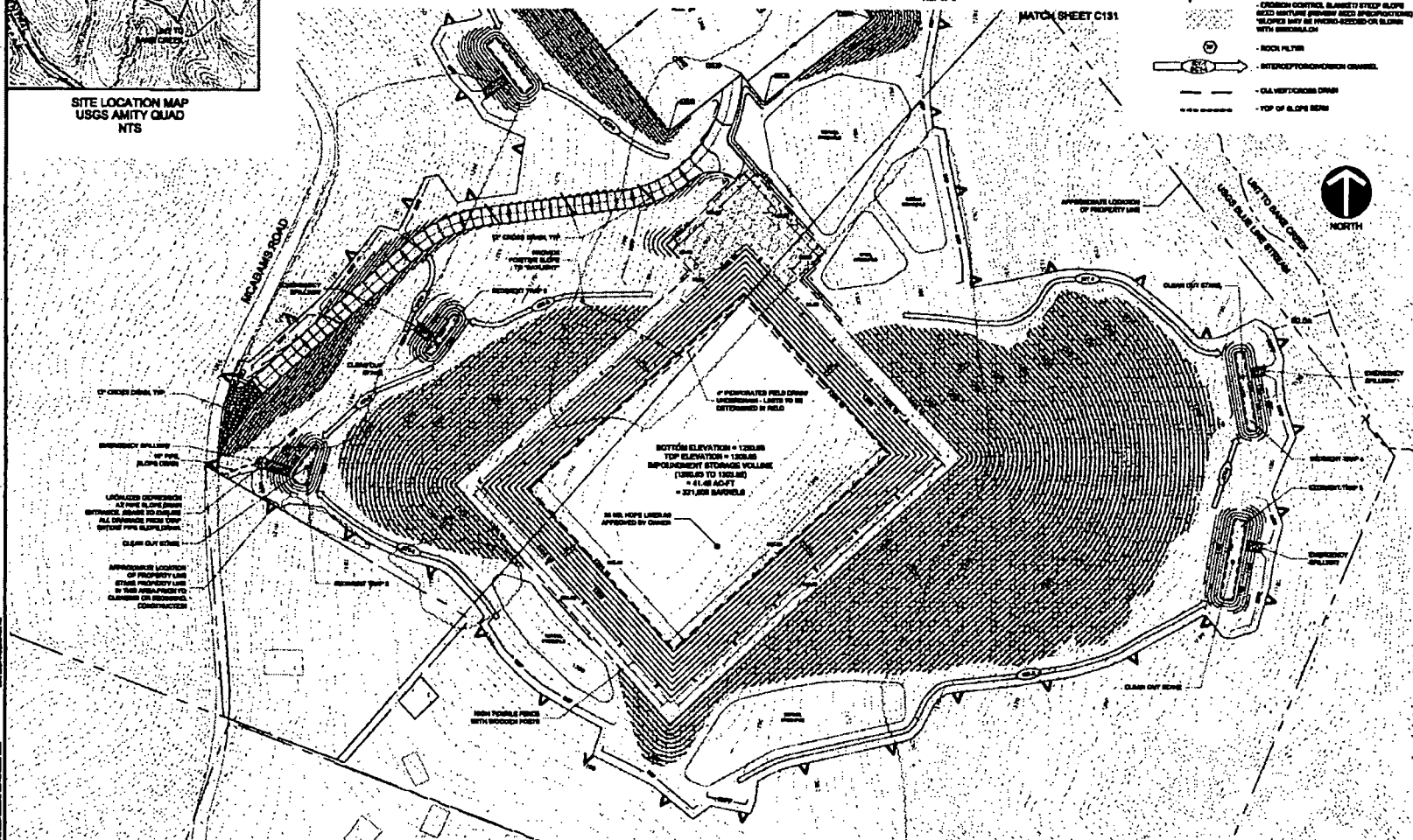
CALL BEFORE YOU DIG!
POTENTIAL LINES AND SITES
CONSTRUCTION PERMITS AND 1-800-242-1776
Pumpkin Patch Old System, Inc.
1-800-242-1776
PDS 000000

TOTAL AREA = 25.0± ACRES
DISTURBED AREA = 25.0± ACRES



EROSION & SEDIMENTATION CONTROL LEGEND

- LIMITS OF DISTURBANCE/PROJECT LIMIT
- REINFORCED FILTER FABRIC FENCE OF HIGH
- SUPER SALT FENCE
- ROCK CONSTRUCTION ENTRANCES
- EROSION CONTROL BLANKET/ STEEP SLOPE
- SEED MIXTURE (PREVENT SEED INFESTATIONS)
- VEGETATION (PREVENT SEED INFESTATIONS)
- ROCK FILTER
- INTERCEPTOR/SEDIMENT CHANNELS
- OIL/WATER/SOLIDS DRAIN
- TOP OF SLOPE BERM



GATEWAY

Engineering & Surveying

1000 N. 10th St., Suite 100

Chattanooga, TN 37402

Phone: (423) 247-1000 Fax: (423) 247-1001

Website: www.gatewayinc.com

YEAGER WELL PAD

AMITY, TENNESSEE

MADEIRIA COUNTY, TENNESSEE

RANGE RESOURCES APPALACHIA, LLC

1000 N. 10th St., Suite 100

Chattanooga, TN 37402

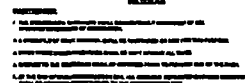
EROSION AND SEDIMENTATION CONTROL PLAN

1000 N. 10th St., Suite 100

Chattanooga, TN 37402

[illegible][illegible][illegible]

SLOW BLANKET INSTALLATION GUIDE



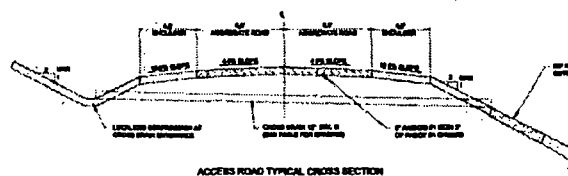
STANDARD CONSTRUCTION DETAIL FOR
ROCK CONSTRUCTION OUTDOOR.....

The major program being tested is control of the construction and maintenance of a wet pond, around leaf, and destruction of debris and sedimentation controls. At 60% lockbox shall be installed in accordance with the approved [60/100] Plan and the [60/100] System and Submittal, Pollution Control Program, manual design into TQM of [60/100] control.

A general contract document is provided below. The construction agreement is designed to provide a general outline of what is to be done in the approach requiring specific adjustments for temporary work, permanent work and various other contract conditions. All necessary parts of the paper are complete. Construction of work pertaining to the plan, other necessary materials or not, are to be performed by the contractor. It is not intended that the drawings and the notes cover every detail of the project or construction. The contractor shall comply with all applicable laws and regulations. The agreement may be reduced to other contracts based on a statement of contract or similar conditions indicated.

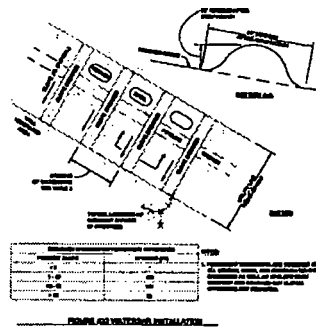
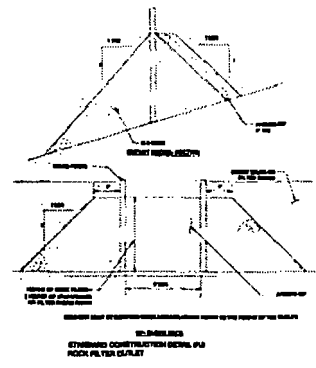
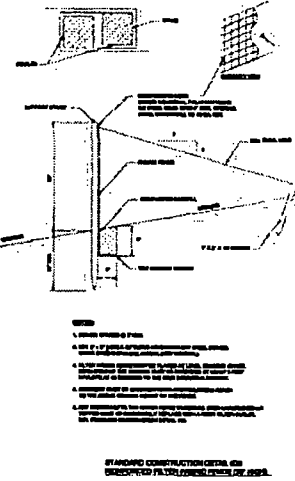
Note: Construction project and the work may not be a part of the construction.

Note: Classification of any one of the four parts may result in any grade in this category.

[illegible][illegible][illegible][illegible]

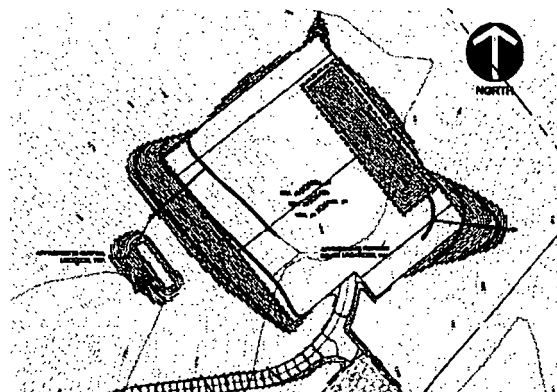
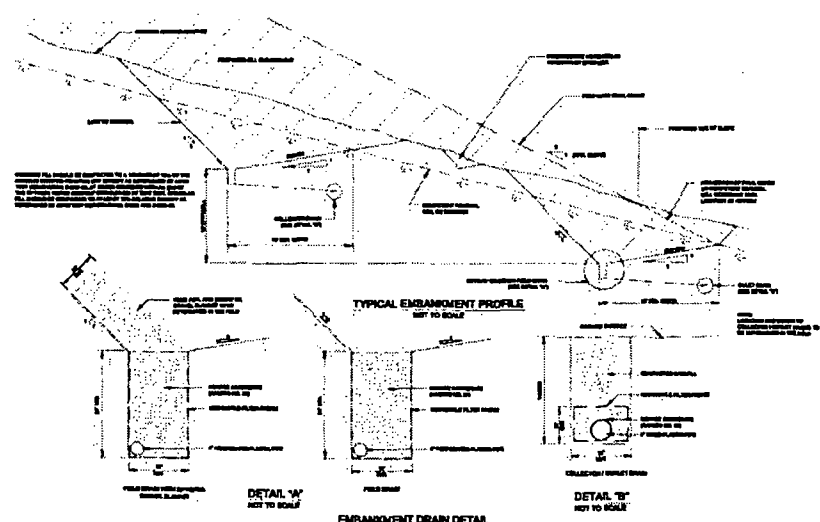
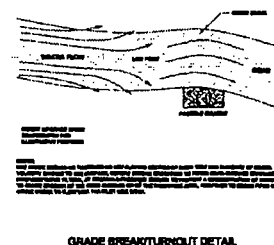
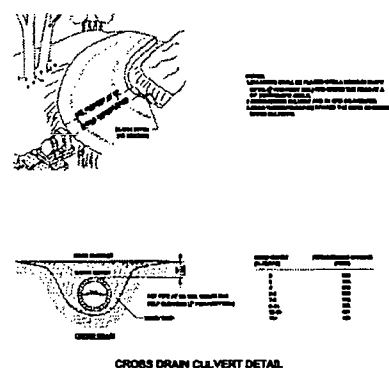
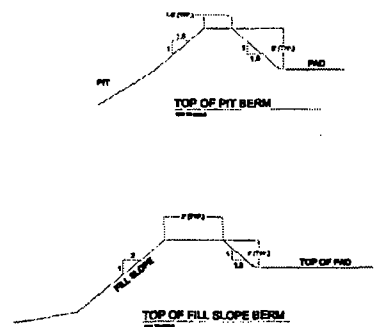
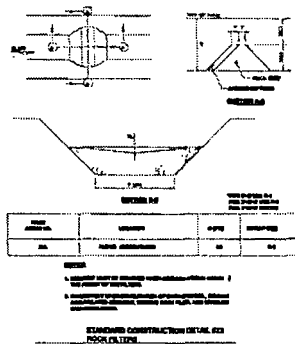
ACCESS ROAD TYPICAL CROSS SECTION





BENTON-OWENS SCHOOL			
CLASS	GRADE	TEACHER	STUDENT
First Grade	First Grade	Miss [Name]	[List of names]
Second Grade	Second Grade	Miss [Name]	[List of names]
Third Grade	Third Grade	Miss [Name]	[List of names]
Fourth Grade	Fourth Grade	Miss [Name]	[List of names]
Fifth Grade	Fifth Grade	Miss [Name]	[List of names]
Sixth Grade	Sixth Grade	Miss [Name]	[List of names]
Seventh Grade	Seventh Grade	Miss [Name]	[List of names]
Eighth Grade	Eighth Grade	Miss [Name]	[List of names]
Ninth Grade	Ninth Grade	Miss [Name]	[List of names]
Tenth Grade	Tenth Grade	Miss [Name]	[List of names]
Eleventh Grade	Eleventh Grade	Miss [Name]	[List of names]
Twelfth Grade	Twelfth Grade	Miss [Name]	[List of names]

[illegible]



EARTHWORK: YEAGER WELL PAD

TOTAL CUT: 20,200 CY
 TOTAL FILL: 20,100 CY

NET: 100 CY CUT
 TOPSOIL: 7,000 CY

*CALCULATIONS ASSUME 1.0' TOPSOIL AND
 DO NOT ACCOUNT FOR STONE VOLUMES

NOTE:
 COHESIVE MATERIALS SHALL BE COMPACTED TO A MINIMUM OF 80% OF THE MAXIMUM MODIFIED PROCTOR DRY DENSITY IN ACCORDANCE WITH ASTM TEST DESIGNATION D-1587, AT WATER CONTENTS WITHIN 3% (+/- 3%) OF THE OPTIMUM WATER ESTABLISHED BY THAT TEST. GRANULAR MATERIALS SHALL BE COMPACTED TO AT LEAST 70% RELATIVE DENSITY IN ACCORDANCE WITH ASTM TEST DESIGNATIONS D-4253 AND D-4254. ALL FILL MUST BE PLACED IN MAXIMUM 10" LOOSE LIFTS.

GATEWAY

CONSTRUCTION

STATE OF TENNESSEE

DEPARTMENT OF REVENUE

RANGE RESOURCES APPALACHIA, LLC

10000 RANGELAND DRIVE, SUITE 100
 CHATTANOOGA, TN 37421

YEAGER WELL PAD

10000 RANGELAND DRIVE, SUITE 100
 CHATTANOOGA, TN 37421

